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SPECIAL PUBLICATIONS

OF THE

LINGUISTIC SOCIETY OF AMERICA

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OUTLINE OF LINGUISTIC ANALYSIS

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Published by
LINGUISTIC SOCIETY OF AMERICA
AT THE WAVERLY PRESS, INC.
Mount Royal and Guilford Avenues
Baltimore, Md.
1942

Printed in the United States of America

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PREFACE

The aim of this booklet is to present in brief summary the techniques of analysis which are necessary for learning a foreign language by the method of working with native speakers and arriving inductively at the grammatical system of their language. The material may be studied by a class or group under the guidance of a trained linguist, or by an individual student working alone. We believe also that the booklet will be useful to the professional teacher of languages in high school and college, and even to the educated layman, as an introduction to linguistic method and to the scientific attitude toward language-learning.

It is becoming necessary today for more and more Americans to acquire foreign languages; and for many of the languages which they must now study, no satisfactory handbooks or teachers are to be found in this country. This situation makes more acute the long-standing need for a guide that will help teachers and learners alike in applying the results of linguistic science to language study. We have tried to make this booklet clear enough to be of service to anyone, regardless of his previous training, who is now engaged in the study of a foreign language. If he will first read Professor Leonard Bloomfield's *Outline Guide for the Practical Study of Foreign Languages* (published at the same time and in the same series as the present work), and if he will then study and practice the techniques here described, he should be able, with the help of a native speaker, to acquire a good speaking knowledge of any foreign language in a relatively short time.

We make no claim to originality in the material here presented. Most of the facts and many of the interpretations will be thoroughly familiar to linguists, for we have borrowed freely from our colleagues. Since, however, the booklet is intended for non-specialists, we have thought it better to acknowledge here, once and for all, our general indebtedness to other workers in the field, than to interrupt our presentation by footnotes pointing out specific debts on almost every page.

On the other hand, the treatment in Chapters II–IV, as distinct from the material treated, may fairly be called our own; and the principles of classification upon which the treatment is based—though they derive to some extent from the influence of other linguists—are the result of several years' discussion, correspondence, and practical testing.

The preparation of this guide was undertaken at the suggestion and under the auspices of the Committee of the American Council of Learned Societies on the National School of Modern Oriental Languages and Civilizations; it is published by the Linguistic Society of America on behalf of the Committee.

Two long passages—§4.8 on the suffix *-ous* and all but the first section of Chapter V—were written in first draft by Professor Leonard Bloomfield. The whole booklet owes much—far more than we can adequately express—to the searching criticism of Professors Bloomfield, Franklin Edgerton, and Edgar H. Sturtevant. All three have read the manuscript in each of its several drafts; and their comments have invariably resulted in clearer phrasing, better examples, and the elimination of downright errors.

CHAPTER I. LANGUAGE AND LINGUISTICS

1.1. The importance of language. A LANGUAGE is a system of arbitrary vocal symbols by means of which a social group cooperates.

Every normal human being is a member of a social group, sometimes of more than one; and every human being depends, in all his social activities, on the use of language. Without language, human society is unthinkable; language is the link between otherwise unconnected nervous systems, and thus the means by which a stimulus acting on one man may produce an effective response in another, or in all the members of the group. Other means of communication—gestures, pictures, flag signals, and above all writing—are either inadequate to the demands of the social organism, or else derive entirely from spoken language and are effective only in so far as they reflect this.

The activities of a society—that is, of its members—constitute its CULTURE. The ethnologist speaks of material and non-material culture. The former includes the physical objects with which the members of a society are concerned—houses, clothing, decoration, tools, and the like; the latter includes the organization of the social group—its religion, laws, and all conventionalized habits, including language. Material culture can be studied, superficially at least, by looking at the objects involved. Non-material culture can be studied only by observing what the members of the group say and how they act while speaking; and even the objects of material culture are fully understood only if we know what they are called and what their purpose is said to be.

Language, then, is not only an element of culture itself; it is the basis for all cultural activities, and therefore the most accessible and the most rewarding clue to the characteristic features of any contemporary social group. The importance of language for the student of culture is summed up in this paragraph by Leonard Bloomfield:

'Each community is formed by the activity of language; speech utterances give us the most direct insight into its workings and play a part in everything that is done. In order to observe a human group, we must understand its speech. If we want to probe deeper into the ways of the community and their historical origin, we must possess, to begin with, a systematic description of its language. In order to know anything about mankind, we must study in this way a varied set of communities. What little we know about man has come from study of this kind. Without such knowledge, we are slaves, in this matter, to rationalization, prejudice, and superstition.' ('Philosophical Aspects of Language', *Studies in the History of Culture.*)

1.2. The nature of language. Language is the term by which we refer to all the specific languages used in all communities. When we call a language a system of arbitrary vocal symbols, we refer to four important aspects of its nature.

(1) A language is a SYSTEM. In this it is no different from other parts of non-material culture, like a religion, a body of laws, or a code of politeness. A system cannot be observed directly; it is, in the last analysis, only an orderly

description of observable features of behavior. Thus we are able to formulate the legal system of a community only by observing some of the actions performed by its members and the relation of one act to another, at the same time noting what people say about these actions—for example, by observing that homicide is regularly followed by certain retributory acts, and that people speak of homicide as a crime and of the retribution as legal punishment. The laws of the community—whether formulated by the community itself or by a visiting ethnologist—are simply an orderly description of these acts and their relations. In the same way, the grammar of a language is simply an orderly description of the way people in a given society talk—of the sounds that people utter in various situations, and of the acts which accompany or follow the sounds.

(2) A language is a system of SYMBOLS. The utterances of speakers are correlated symbolically with objects and events of the practical world; that is, the utterances 'stand for' various features of experience, or, as we say, they have meanings. In spite of the superstitious veneration often accorded to mere words even in civilized societies, it is important to remember that words are only symbols, not somehow mystically identical with the objects and events they symbolize.

The MEANING of a linguistic form (a word, a part of a word, or a combination of words) is the feature common to all the situations in which it is used. Meaning is thus a matter of the practical world around us—a matter of social and cultural relations as well as of purely objective 'reality'. It is clear from our definition that a speaker normally learns the full and precise meaning of any word only by hearing it used in a variety of situations, and that the meaning of a given word may differ slightly or considerably for different speakers, even within a small community. To define the meaning of any word for a single speaker, it would be necessary to analyze all the situations in which he had heard and used it, in order to isolate the common feature—obviously an impossible task. In practice, we are content with approximate definitions, arrived at by contrasting a few typical situations in which the word occurs with a few similar situations from which it is absent. Even this kind of definition, however, lies outside the scope of linguistic method (§1.4), which is concerned solely with the linguistic symbols themselves.

(3) The symbols which constitute a language are VOCAL symbols. Other kinds of symbols are possible, and play parts of varying importance in human activities. Gestures, more or less conventionalized pictures, signal flags, and traffic lights are common visual symbols. Drum beats and bugle calls, the tolling of bells, sirens and whistles are auditory but not vocal symbols. None of these, even when they make up a fairly complicated system, are language; we reserve this term exclusively for a system in which the symbols are vocal sounds—sounds produced by human beings through various movements of what we call the vocal organs (see §2.5). WRITING is a secondary visual representation of speech; the visual symbols of writing can in turn be represented by audible symbols, as in the transmission of Morse code, and by tactile symbols, as in Braille.

Not all sounds produced by the human vocal organs are linguistic symbols. Sneezes, coughs, grunts, and cries usually have no symbolic value: they do not 'stand for' anything outside themselves. It is only when a sound of this kind has a definite conventional meaning in a particular social group—for instance, when a light cough is understood to symbolize deference or embarrassment—that it may acquire a sort of marginal status in the language of the community.

(4) Finally, the linguistic symbols are ARBITRARY. There is no necessary or philosophically valid connection between a vocal utterance and its meaning. This is obvious to everyone who knows more than one language. To refer to an animal of the species *Equus caballus*, a speaker of English says *horse*, a Frenchman *cheval*, a German *Pferd*; speakers of other languages use still other words. Even imitative or onomatopoetic words differ from language to language: we imitate the barking of a dog with *bowwow*, a Frenchman uses *gnaf-gnaf*, a Japanese *wan-wan*. All these words are equally appropriate, since all are equally arbitrary. It is convention alone—a kind of tacit agreement among the members of a social group—that gives any word its meaning.

This elementary truth, which no one disputes after a moment's reflection, is nevertheless often forgotten by students of a foreign language. Accustomed to the arbitrary symbols of their own language, they come to regard these as logical or necessary, and are surprised by the perversity of the foreigner, who uses an outlandish name like *Pferd* for what is obviously nothing but a horse. This kind of naïve surprise is more likely to be evoked by the grammatical structure of a foreign language than by its vocabulary; some persons even go so far as to elevate the grammar of a particular language—usually Latin—to the rank of abstract reason, and to regard all deviations from this pattern in other languages as illogical corruptions. The student who is once thoroughly convinced of the arbitrary nature of all linguistic symbols will not fall into mistakes of this kind. He will take each language as he finds it, and set himself to learning its vocabulary and grammar without the inhibiting prejudice of the bigot to whom all that is unfamiliar seems absurd.

1.3. The learning process. Every normal human being learns at least one language in childhood, which he continues to use through life, constantly learning new material and participating in such changes as may take place in the usage of his community. The process of acquiring a language, whether in infancy or in later life, is always essentially the same. One must have a source of information; one must learn to recognize and to reproduce the utterances provided by that source; and one must analyze and classify the utterances one has learned. The best source of information is an INFORMANT, a native speaker. (The technique of working with an informant is described in Leonard Bloomfield's *Outline Guide for the Practical Study of Foreign Languages*, published in the same series as the present work. The advice there given is not repeated here.)

To learn a language from an informant one needs only the normal intelligence of a small child; there is no special 'gift for languages' possessed by some but not by others. Everyone who is not deaf or idiotic has fully mastered his native language by the end of his fifth year, no matter how difficult or complex it may

seem to strangers; and whoever has accomplished this feat can go on, at any later age, to acquire facility in one or more foreign languages—provided only that he has access to a reliable source of information, that he has plenty of time for the task, and that he goes about it in the right way, unhampered by prejudice and misconceptions.

One of the steps in learning a language is to reproduce the utterances of one's informant (cf. §2.1). The child, having no fixed speech habits, imitates his parents and the other speakers about him without prejudice. By a long process of trial and error, during which he makes countless experiments and receives a good deal of explicit correction, he finally attains to fluency. An adult, on the other hand, has already acquired a set of speech habits. The facility with which he moves his vocal organs in pronouncing his native language entails a corresponding want of skill in performing other movements; and when he studies a foreign language he is often inhibited from freely imitating his informant—sometimes to such a degree that he calls the foreign sound unpronounceable for all but native speakers. Such a conclusion is always a mistake: no language uses any sound which a foreigner cannot learn to pronounce perfectly. He needs only some basic training in phonetics, enough practice, and the comforting knowledge that there is no such thing as an unpronounceable sound in any language in the world. An outline of general phonetics, which should help the student to master the pronunciation of any language he attacks, is contained in Chapter II.

To analyze and classify the material he learns from an informant, the student must have either the child's long years of trial and error, or some training in the techniques of linguistic analysis described in Chapters III, IV, and V. As a result of applying these techniques, the student learns the foreign language as a system, not merely as a random list of unfamiliar expressions; and if at the same time he learns the basic elements of the foreign vocabulary, he should be well on his way to using the language like a native speaker.

1.4. Linguistic science. A linguist is not necessarily a polyglot, with a practical command of many languages. He is a scientist whose subject-matter is language, and his task is to analyze and classify the facts of speech, as he hears them uttered by native speakers or as he finds them recorded in writing. As already stated (§1.2), he is less directly concerned with meanings than with the structure and relation of the linguistic symbols themselves; but the nature of his subject-matter obliges him to pay attention to meanings also (cf. §4.1). When he has described the facts of speech in such a way as to account for all the utterances used by the members of a social group, his description is what we call the system or the grammar of the language.

To explain the facts which he has described, the linguist traces the forms of a language back through the past, and compares them with corresponding forms in related languages. In terms of linguistic science, the only answer to the question Why? is a historical statement. Why do we call an animal of the species *Equus caballus* a horse?—because that is what our parents called it, and their English-speaking ancestors before them for over a thousand years. Why do we say

stone where a Frenchman says *pierre*?—because in the English of King Alfred's time people said *stān*, and because the vowel of this word, as of many others, changed from the sound of *a* in *father* to the sound of *o* in *go*. Why is the plural of *goose* not *gooses*?—because in the ancient language of which both English and German are divergent modern developments, noun plurals were formed in different ways, and because the prototype of *goose* belonged to a different category from such words as *stone*. It is important to remember that linguistics can explain the facts of a language only in this way: by stating what the corresponding facts were at an earlier stage of the language and by describing the changes that have intervened. Attempts to answer the question Why? in other ways—by appeals to psychology, philosophy, or abstract logic—may seem esthetically more satisfying, but are never anything better than guesses, unprovable and fruitless.

When he has analyzed and classified the speech behavior of one or more native speakers, or the speech behavior of a community as reflected in its writings, the linguist is in a position to set down his results in a concise and orderly form for the information of others. He can write a grammar of the language (telling what the speakers say when they talk, not what he thinks they ought to say), and compile a dictionary and a collection of texts. He can also write a primer, presenting the linguistic material in graded lessons for the benefit of the beginner.

When such elementary books are available, the student can often save time and avoid some initial mistakes; but the informant is still indispensable. Even the best book cannot pronounce sounds, and even phonograph records cannot answer special questions that arise from time to time. The great value of a scientifically prepared learner's book is that it presents the details of the language already analyzed and classified, and directs the student's attention at once to the important features upon which he must concentrate. When no primer of a language exists, the systematic grammar will often be of great help to the student; but in using it he must, as it were, grade the material for himself, and must give most of his time to the informant.

Unfortunately, there is almost no elementary treatment of any language prepared by a trained linguist. For the better-known languages there are many partial studies, good and bad; all but the worst of these may be of service to the student, provided that he uses them only to supplement, never to replace, his work with a native speaker. For most languages nothing at all is in print; the student must start from scratch, and work out the system for himself. If he is lucky enough to secure the guidance of a trained linguist, who either knows the foreign language or will himself learn it with the student, the latter will make faster progress than if he must work alone or under the direction of a teacher untrained in linguistic methods. In any case, he must familiarize himself with the techniques of analysis and classification outlined in this booklet.

CHAPTER II. PHONETICS

2.1. The use of phonetics. The first problem that confronts the student in his effort to acquire a speaking-knowledge of a modern foreign language is its pronunciation. Before he can begin to learn any part of the grammar or to assemble the most elementary vocabulary, he must be able to recognize the sounds of the language as uttered by native speakers, and must be able to produce them himself in such a way that natives will understand him. Note that we are concerned here exclusively with the SOUNDS OF SPEECH, not with letters of the alphabet nor with any other symbols used in writing the language. When the student has mastered the pronunciation, he may find it convenient or necessary to learn also the foreign system of writing (if there is one for the language he is studying); but until he has a thorough practical knowledge of the pronunciation, any preoccupation with the written form of the language is likely to be confusing and ineffective.

It is possible, by residence in a foreign community or by long association with native speakers of a foreign language, to acquire a good command of the pronunciation without systematic study; but for most students such a course is impossible, and in any case it is a waste of time. The same results, or still better, can be achieved in a far shorter time—often in a couple of weeks or less—by approaching the study of the foreign language phonetically: that is, by subjecting the foreign sounds to the techniques of analysis, description, and classification which constitute the science of phonetics.

The student trained in phonetics has three great advantages over one who attacks the pronunciation of a foreign language by the usual hit-or-miss method. (1) Knowing the structure and the function of the speech mechanism, he is able to analyze the formation of the foreign sounds and to describe them so precisely and yet so simply that he himself, or anyone else with similar training, can produce the sounds correctly by moving his vocal organs according to the description he has formulated. (2) He is able to classify the bewildering multiplicity of the foreign sounds in such a way as to reveal their functional relation to each other, and thus to reduce the apparent chaos to an orderly system of a few dozen units. (3) On the basis of this system, he is able to devise a practical working orthography for the foreign language, easily written and read, which he can use to note words and grammatical features as he learns them and to record connected sentences and texts.

The rest of this chapter and the following will be devoted to an outline of the techniques on which these accomplishments depend: general phonetics, and phonemics. Remember that these techniques, interesting as many people find them, are not ends in themselves, but simply the means to an accurate and usable description of the facts of pronunciation and hence to a rapid mastery of the language.

2.2. General phonetics. To describe and master the pronunciation of any one language, it is necessary to know only a few of the countless varieties of sounds

which the human vocal organs can produce. If your object is to learn French, any knowledge of the final sound in German *Buch* 'book' is useless and irrelevant; if it is German you want to learn, you need not know anything about the sound spelled *gn* in French *agneau* 'lamb'; and in neither of these tasks will you profit from your ability, as a speaker of English, to pronounce the sound spelled *th* in *thick*. Any one language exploits only a minute fraction of the total possibilities, and no two languages use exactly the same range of sounds.

It is precisely this variety of sounds from language to language, combined with the impossibility of predicting what sounds will occur in any language not yet studied, which makes a general survey of the whole domain of speech sounds the only safe preparation for the student of modern foreign languages. It is true that in such a survey he may learn much that he will never have occasion to use; but on the other hand, if the survey has been broad and deep enough, he will almost never find anything in the pronunciation of a foreign language that seems completely strange to him. The immediate benefit of general phonetic training, therefore, is that it equips the student to deal independently with all the special problems he may meet in his exploration of any particular language.

But there is another benefit. However well the student may know the sounds of a particular language, his knowledge is clarified and sharpened by the perspective of general phonetics. His understanding of the English *t* in *tin*, for example, is greatly deepened if he knows not only how it differs from the *d* in *din* and the *s* in *sin*, but also how it differs from the French *t* in *tard* 'late', the Hungarian *t* in *táj* 'region', or the Chinese *t* in *ta* 'great'. It is this perspective that enables him to compare any two sounds he has ever heard, and on the basis of such comparisons to construct a system of classification flexible enough to include all sounds.

2.3. Terminology. In order to talk about sounds, we must have a set of terms with precisely defined meanings. The terms themselves are of course not important; only the practical considerations of convenience and convention will guide us in our choice.

A speech sound is a physical event with three main aspects. (1) PHYSIOLOGICAL: the speaker makes certain movements with his lips, tongue, and other vocal organs. (2) ACOUSTIC: these movements set up vibrations of air molecules inside his mouth and nose, which are propagated as 'sound waves' through the air about him until they strike the tympanum of the hearer's ear. (3) AUDITORY: corresponding vibrations are produced in the tympanum, which then acts upon the mechanism of the inner ear and through this upon the auditory nerves in such a way that the speaker 'perceives a sound'. Theoretically, any one of these three aspects of a sound could be made the basis of a scientific terminology.

In popular speech, terms descriptive of speech sounds are almost exclusively auditory; they refer, in a vague way, to the hearer's impression. Thus, the vowel of *cash* is 'flat', the vowel of *calm* 'broad'; the *g* of *get* is 'hard', the *g* of *gem* 'soft'; 'hard' and 'soft' are used also of the two sounds of *s* in *see* and *rose*, though here people often disagree about which is which. Other sounds are

said to be 'bright' or 'dull' or 'thin' or 'harsh'; even the term 'guttural', which might seem to denote sounds formed in the throat (whatever that would mean), is used merely as a vague synonym for 'strange' or 'unpleasant'. It is obvious that such terms are neither inclusive enough nor exact enough in their application to serve our purpose. Indeed, no usable terminology has yet been developed for describing the auditory effect of speech sounds.

Acoustics, a branch of physics, measures the vibrations of air molecules which we call sound waves. Since these measurements are expressed in mathematical terms, they might well be adopted by linguists; but there is a twofold objection. The use of a strictly acoustic terminology presupposes extensive training in physics and mathematics, for which few linguists have time; and it depends on the use of special laboratory apparatus, which again few linguists are equipped to handle. In short, acoustic terms, for all their precision, are meaningless to nearly every linguist.

The movements and positions of the vocal organs, on the other hand, can be learned (and in favorable cases directly observed) without previous special training. Any sound can be unambiguously and simply described in terms of the movements which produce it; and the laboratory apparatus on which the terminology is based—lips, teeth, tongue, palate, and so on—is standard equipment for all linguists. Moreover, it is easy after some practice to convert a physiological description of a sound into the sound itself by simply making the movements specified. Convenience, then, is fully satisfied by a terminology of this kind; and since nearly all phoneticians are in the habit of using it (though not always without some admixture of auditory terms), convention is satisfied also. In the rest of this chapter, then, all phonetic terms will be based on the physiological production of the sounds—in a word, on their ARTICULATION.

(The student must be warned that the terms used in this booklet to designate various categories of sounds are not the only ones current; but we have thought it better in most cases to provide only a single name for each category than to confuse him with a list of synonyms. Thus warned, he will not be surprised or dismayed to find other terms, and even other methods of classification, in various books on phonetics. If he learns the terminology given here, and understands the classification which it reflects, he will usually have no difficulty in translating other names.)

2.4. The formation of speech sounds. In its simplest terms the human speech mechanism may be compared to a wind instrument such as a clarinet or a flute: in both, sounds are produced by stopping, obstructing, or otherwise interfering with the free flow of a column of air through an enclosed passage. In the human mechanism, the column of air is furnished by the lungs, from which it is expelled by controlled action of the diaphragm. As this air passes upward through the larynx and the pharynx, and then forward and out through the mouth or the nose or through both, its flow may be stopped or impeded at various points along the way, and the shape of the chambers through which it passes may be variously modified. It is by this kind of 'playing' on the column of air as it flows from the lungs to the nostrils or the lips (sometimes also as it is drawn back into the lungs) that we produce all the sounds of human speech.

There are five chief types of articulation.

(1) The current of air may be completely stopped at some point by closing the passage through which it flows. Sounds so formed are STOPS (e.g. *p, t, k, b, d, g* in *pop, tot, kick, bib, dead, gag*).

(2) The passage may be constricted at some point so as to leave only a narrow aperture, shaped either like a slit or like a groove, for the air current to squeeze through. Sounds so formed are SPIRANTS (e.g. *f, v, th, s, z, sh* in *fat, vat, thin, then, see, zeal, show*).

(3) The median line of the mouth passage may be occluded (stopped), but an opening may be left along one side or both sides for the air current to pass through. Such sounds are LATERALS (e.g. *l* in *let, feel, milk*).

(4) The passing of the air current may cause an elastic organ to vibrate rapidly. Such sounds are TRILLS (e.g. *r* in German *rot*, Provincial French *rouge*, Spanish *rojo* 'red'). Stops, spirants, laterals, and trills are all CONSONANTS.

(5) Finally, the passage may be left relatively unobstructed, but the shape of the oral cavity may be modified by various movements of the tongue and the lips. Sounds so formed are VOWELS.

The student must now familiarize himself with the organs that perform these articulations.

2.5. The vocal organs. What we call the vocal organs or the organs of speech are of course not primarily and not solely concerned with the production of sounds. The lips, the teeth, and the tongue might be called organs of eating, the larynx and the lungs organs of breathing. But we shall disregard here the primary functions of these organs and examine only their secondary function of producing sounds (PHONATION).

The inadequate verbal descriptions of the vocal organs given below should be reenforced by the illustrations included in many works on phonetics. Excellent detailed drawings of all the organs will be found in *Speech and Voice*, by G. Oscar Russell (New York, 1931); several of the books mentioned in the Reading List (see pp. 80–1) contain helpful simplified diagrams, all essentially alike. But drawings and diagrams are not enough. It is essential to an intelligent understanding of this discussion that the student should supplement the verbal description of his vocal organs by careful and continual inspection of the organs themselves. A small mirror is the one indispensable piece of equipment which every practical phonetician must carry with him wherever he goes; and he must use it constantly. A pocket flashlight to illuminate the back part of the mouth is useful also; but the mirror is essential.

The vocal organs are conveniently divided into two kinds: ARTICULATORS, organs which can be moved more or less freely and can thus be made to assume a variety of positions; and POINTS OF ARTICULATION, fixed points or areas lying above the articulators, which these may touch or approach. The tip of the tongue is an articulator, since it can be moved up and down, forward and back, and since this mobility is essential to the production of many sounds; the front upper teeth are a point of articulation, since the tip of the tongue can touch or approach them. In this section we shall discuss briefly each of the articulators, mentioning typical movements and positions and typical points of articulation.

(1) The LOWER LIP may form a complete closure of the mouth passage by being pressed firmly or loosely against the upper lip, as for the *p* in *pit*, the *b* in *bit*, or the *m* in *mitt*. It may approach the upper lip to form a narrow slit-shaped aperture, as for the *b* in Spanish *haber* 'have', *Habana*. The two lips may be pursed and protruded, forming a more-or-less roughly circular opening of various dimensions, as for the *w* in *well*, the *wh* in *wheel*, the vowel in French *loup* 'wolf' or German *gut* 'good', or the vowel in *law*. The lower lip may also touch the edge of the front upper teeth to form a slit-shaped aperture, as for the *f* in *fat* and the *v* in *vat*.

Sounds articulated by the lower lip are called LABIAL. They may be BILABIAL (against the upper lip) or LABIODENTAL (against the upper teeth). Combining these terms with the terms given in §2.4, we describe *p* and *b* as bilabial stops, *f* and *v* as labiodental spirants, the *u* of German *gut* as a vowel with labial modification (see §2.8).

It is possible to produce also a labial lateral (by pressing the lips together in the median line with an opening at one or both sides) and a labial trill; the latter is sometimes heard in the interjection written *brrr*. Sounds of these categories, however, seem not to occur in the normal pronunciation of any language so far described.

(2) The tongue is so mobile that different parts of it can be moved almost independently; for instance, while the back part of the tongue is raised and retracted, the tip can be turned up or thrust forward. For this reason it is useful to treat three sections of the tongue as three separate articulators.

The TONGUE TIP or APEX is the most flexible of the articulators; its extraordinary mobility is familiar to anyone who has ever used it to explore an aching tooth or dislodge a crumb. The apex can be raised to form a complete closure against the edge of the upper teeth, as for *d* in a common pronunciation of *width*; against the inner surface of the upper teeth, as for the *t*, *d*, *n* in French *tout* 'all', *doux* 'sweet', *nous* 'we'; against the alveolar ridge (the hard gum ridge just behind the roots of the upper teeth), as for *t*, *d*, *n* in English *toe*, *dough*, *no*; or against the hard palate still farther back, as for the *d* in some Mid-Western pronunciations of *harder*. Against the same points of articulation, the apex can form a narrow slit-shaped aperture, as against the edge or back of the upper teeth for the *th* in *thin* and *then*; or a small groove-shaped aperture, as against the alveolar ridge for the *s* in *see* and the *z* in *zeal*. While forming an occlusion in the median line of the mouth, it can leave a lateral opening (on one or both sides), as for the various *l* sounds in French *lire*, German *lesen* 'read', English *let*, *girl*. When the apex is slightly raised, the air stream can set it into rapid vibration against the upper teeth or the alveolar ridge, as for the *r* in South German *rot* or Spanish *rojo*.

Sounds articulated by the apex are called APICAL. More precise descriptions are possible by referring to the various points of articulation: INTERDENTAL, against the edge of the front upper teeth or between the upper and the lower teeth; POSTDENTAL, against the inner surface of the upper teeth; DENTAL, an inclusive term for both the preceding; ALVEOLAR, against the alveolar ridge;

CACUMINAL, against the hard palate behind the alveolar ridge (hence pointing toward the top or peak of the vaulted palate, Latin *cacūmen*).

It is occasionally useful to distinguish the extreme tip of the tip, the POINT, from the edge of the tongue immediately behind and around this, the BLADE. The *s* in *see* already mentioned is articulated by the blade; the different varieties of *r* in American English *rye, cry, try, dry* are articulated by the point only. Both kinds of sound involve the formation of a groove-shaped aperture against the alveolar ridge.

(3) The broad surface of the tongue is divided into two sections. Of these, the part lying immediately behind the apex, and extending about 1½ inches back from the blade, is called the FRONT. The front usually articulates against the HARD PALATE, that part of the roof of the mouth which lies directly above it when the mouth is closed and the tongue relaxed. It can form a complete closure, as for the *gn* in Italian *ogni* 'all' and French *agneau* 'lamb'. A groove-shaped constriction between the front and the hard palate produces the most common variety of the spirants written *sh* in *show* and *z* in *azure;* a slit-shaped constriction is also possible, but cannot be illustrated from the more familiar languages. The front forms an occlusion in the median line, with lateral opening, for the *gl* in Italian *egli* 'he' and *doglia* 'grief', or for the *ll* in Castilian Spanish *llamar* 'call'. No trill is possible in this position.

Consonants formed with the front of the tongue are called FRONTAL, or more commonly PALATAL (in reference to the hard palate). Different points of articulation are designated by the terms PREPALATAL, MEDIOPALATAL, and POSTPALATAL, indicating that the front touches or approaches respectively the anterior, the middle, or the posterior part of the hard palate.

One of the most important functions of the front is to modify the shape of the oral cavity in the articulation of vowels. Observe the position of your own tongue as you pronounce the vowels in *ham, hay, he;* you will notice that the front is raised successively nearer to the hard palate. Vowels articulated by the front of the tongue might be called frontal or palatal, but are usually called simply FRONT VOWELS.

(4) The BACK or DORSUM of the tongue extends from a point about 1½ inches from the apex to the extreme rear of the mouth. The part of the roof of the mouth which lies directly above the dorsum when the mouth is closed is the SOFT PALATE or VELUM; this is a boneless muscular arch capable of independent movement up and down. The UVULA is the small fleshy pendant hanging from the posterior edge of the velum. To observe the structure and the movement of these parts in your mirror, place your tongue in the position for pronouncing *ah;* if you cannot keep it flat in the mouth, press it down gently with a wooden spatula. Inhale slowly through the mouth, then exhale slowly through the nose. You will see the velum, with the uvula dangling from it, rise as you inhale, sink as you exhale; but if you now inhale through the nose and exhale through the mouth, the rising and sinking of the velum will be reversed. The velum acts as a flap or cover for the opening (behind and above the palate)

which leads to the nasal cavity. When the velum is raised, this opening is shut off, and the air stream is forced to flow entirely through the mouth; when the velum is lowered, the air stream has access to the nose. In spite of its mobility, we do not consider the velum an articulator; for the significance of its functions in the classification of sounds see §2.10 (1).

The dorsum can form an occlusion against some part of the velum, as for the *k* in *keep*, the *c* in *coop*, the *g* in *geese* and *goose*, and the *ng* in *sing*. It forms a slit-like aperture against various parts of the velum for the *ch* in German *ich* 'I' and *Bach* 'brook' and for the untrilled *r* in Parisian French *rouge*. It forms an occlusion with lateral opening for the *l* in a common but usually unnoticed pronunciation of *milk* and *vulgar*. Finally, the dorsum can be raised and grooved in such a way that the uvula is cradled in the groove and pointed forward; the air stream then sets the uvula vibrating in a clear trill, as for the *r* in North German *rot* or in Provincial French *rouge*. It is possible also to produce a constriction in the PHARYNX (the cavity at the extreme back of the mouth, between the larynx and the entrance to the nasal passage) by retracting the lowest part of the dorsum (sometimes called the ROOT) or simply by contracting the musculature of the pharynx itself.

Consonants formed with the dorsum are called DORSAL, or more commonly VELAR. Different points of articulation are designated by the terms PREVELAR, MEDIOVELAR, and POSTVELAR (or UVULAR). Sounds articulated in the pharynx are called PHARYNGAL.

Like the front, the dorsum is important also for the articulation of vowels. Observe the position of your tongue as you pronounce the vowels of *haw*, *hoe*, *who*; you will notice that the dorsum is raised successively nearer to the velum. Vowels articulated by the dorsum are usually called simply BACK VOWELS.

(5) All air expelled from the lungs or drawn into them must pass through the LARYNX, a complex structure of cartilage, muscles, and membranes at the top of the trachea or windpipe. The front edge of the larynx forms the Adam's apple. For our purpose the most interesting parts of the larynx are two parallel transverse banks or bands of muscle extending from front to back, the so-called VOCAL CORDS. (The name is a poor one, since there is nothing cord-like about these muscles; 'vocal lips' has been suggested as a better name, but the other is established in usage.) During ordinary respiration, the vocal cords are drawn apart, so that the air current can pass in and out between them without obstruction. The space between the vocal cords is called the GLOTTIS; for ordinary breathing, therefore, we say that the glottis is open.

The vocal cords are capable of extremely delicate and precise adjustment: the glottis can be narrowed, reduced to a slit, or closed entirely. When it is only slightly narrowed, the air current is hardly impeded; this is the position usually assumed for the *h* in *hair*, *hall*. When it is closed, the air current is completely stopped, and no air can flow into or out of the lungs until the closure is released. This GLOTTAL STOP is an important speech sound in many languages; its non-linguistic usefulness can best be observed when we have to keep air locked in our lungs to resist the pressure of the abdominal muscles, as in defecating or in lifting a heavy object from the floor.

When the glottis is nearly but not quite closed, the passing air current sets the elastic edges of the vocal cords into rapid vibration, which produces the musical tone or hum technically known as VOICE. Any sound whatever, except the glottal stop, can be pronounced both with and without voice—i.e. with and without this concomitant vibration of the vocal cords; and all sounds can accordingly be classified into VOICED and VOICELESS. (On the relation between voiced and voiceless *h* see below.) The *z* of *zeal* is voiced; the corresponding voiceless sound is the *s* of *see*. If you will pronounce the two sounds clearly and long-drawn-out, and at the same time put your hands tightly over your ears, you will hear during the production of the *z* a loud hum inside your head (the tone resulting from the vibration of the vocal cords) which is completely absent when you say *s*. Other pairs of voiced and voiceless sounds are the *v* in *veal* and the *f* in *feel*, the *th* in *either* and the *th* in *ether*, the *b* in *rubber* and the *p* in *upper*. You will find it easy and instructive to add to this list yourself.

Differences in the pitch of the voice (higher and lower) are important not only in singing but in the normal speech of every community; compare the difference in pitch between *Yes!* and *Yes?* or the like. These differences are produced by controlling the tension of the vocal cords so as to make them vibrate at a faster or a slower rate. The change in the pitch of the voice itself is independent of the articulation of the other organs. Both a *z* (as in *zeal*) and an *a* (as in *calm*) can be spoken at any pitch within the range of the speaker's voice; but a voiceless sound like *s* cannot be varied in pitch in the same way. (Though the vibration of the vocal cords might be called a trill [cf. §2.4], we reserve this term for the vibration of supraglottal organs—i.e. of organs lying above the glottis.)

If the glottis is reduced to a slit somewhat wider than the one required for voice, the vocal cords may vibrate weakly but at the same time allow most of the air to escape without obstruction. This kind of half-voice is called MURMUR; murmured sounds are often substituted for all voiced sounds when we talk softly, and a murmured *h* (the voiced *h* mentioned above) is sometimes used instead of the completely voiceless kind in words like *perhaps, behind, unhappy*. Pronounce these words in a natural relaxed manner with your ears stopped: if the hum which accompanies the sounds before and after *h* is interrupted by a moment of silence, you are pronouncing a voiceless *h*; if the hum is only momentarily reduced in volume, your *h* is murmured.

WHISPER is produced by narrowing the glottis almost to the position for voice and then stiffening the vocal cords so as to prevent vibration. In whispered speech, the normally voiced sounds are replaced by whispered sounds, the normally voiceless sounds are unchanged. Various other adjustments of the vocal cords are possible, but play a less important part in phonation.

Sounds whose chief articulation is performed by the vocal cords are called GLOTTAL. These are the glottal stop, *h*, and the voiced or murmured *h*. On the other hand, the voice tone is best regarded as a subsidiary feature of sounds articulated by the supraglottal organs; thus the voiced *z* and the voiceless *s* are both apical (blade) spirants, the voiced *b* and the voiceless *p* are both bilabial stops.

Aside from the movements of the vocal cords, the larynx as a whole can be moved in two ways. It can be raised and lowered in the throat (notice the displacement of the Adam's apple when you swallow); and it can be constricted by a tightening of its entire musculature. The significance of these movements will be discussed in §2.13.

2.6. The classification of speech sounds. We have already made a beginning toward the physiological classification of speech sounds. The types of articulation described in §2.4 provide a criterion for dividing all sounds into the two great classes of vowels and consonants. A VOWEL is a sound for whose production the oral passage is unobstructed, so that the air current can flow from the lungs to the lips and beyond without being stopped, without having to squeeze through a narrow constriction, without being deflected from the median line of its channel, and without causing any of the supraglottal organs to vibrate; it is typically but not necessarily voiced. A CONSONANT, conversely, is a sound for whose production the air current is completely stopped by an occlusion of the larynx or the oral passage, or is forced to squeeze through a narrow constriction, or is deflected from the median line of its channel through a lateral opening, or causes one of the supraglottal organs to vibrate.

The dividing line between vowels and consonants is admittedly blurred. Some vowels, as we have seen (for instance in *he* and *who*), are pronounced with considerable elevation of the front or the dorsum; if the articulator is raised still further, it soon approaches the roof of the mouth close enough to form a constriction. Still, the definition of vowels as unobstructed sounds will serve all practical purposes.

§§2.8–13 will be devoted to further subclassification of the two primary classes already established.

2.7. Phonetic symbols. Before we can discuss the sounds of speech in more detail, we must have a way of representing them on paper. The ordinary spelling of English and other European languages obviously will not serve; one has only to consider than the letter *a* spells five different vowel sounds in *cat, came, calm, call, sofa,* or that eight different letters and combinations of letters are used to spell the same vowel sound in *Pete, feet, meat, seize, niece, key, quay, police,* to see that conventional orthography would leave us floundering in any discussion of sounds.

Wherever necessary, therefore, we shall symbolize the sounds we talk about by letters with specially defined PHONETIC VALUES. In order to distinguish phonetic symbols from letters of the conventional orthography, it is customary to enclose the former in square brackets. Thus [a] is a phonetic symbol, defined as having a particular value; *a* is a letter of the ordinary English (or French or Latin) alphabet, used in various ill-defined and contradictory ways to spell various sounds differing from language to language.

The definition of any phonetic symbol is important, and should always be framed with care; but the symbol itself, or rather the choice of one symbol in preference to any other, is of no importance whatever. In the next section we

shall use the letter [a] to denote a particular category of vowels, defined with as much precision as our intended use of the symbol makes necessary; and whenever we write [a] we shall be representing a sound of the category we have defined. But it should be clearly understood that we attach no importance of any kind to the letter [a] itself: our only reason for choosing it is that it happens to be already current in this value in linguistic books. If any other symbol were equally common in the same value, or if there were no established way of symbolizing the sound, then we should be unable to defend our choice of [a] except by asking the unanswerable question, Why not? This principle cannot be too insistently emphasized: if it were convenient or usual or for any practical reason desirable to represent the sound of the vowel in *palm* by the letter [s] or by the figure [4] or by a small picture of a palmtree, then that letter or figure or picture—once we had explicitly defined its value in our transcription—would make a perfectly acceptable phonetic symbol. We are interested in sounds only, not in marks on paper.

This does not mean that we may abandon all discretion in our choice of symbols. There are already several widely used phonetic alphabets in existence; and the many hundreds of people who are familiar with these alphabets would be not unreasonably outraged if we attempted to introduce a completely new set of symbols, ignoring and contradicting the symbols they are accustomed to use. Once more the only safe guides are convenience and convention. In what follows, therefore, we shall depart as little as possible from the established usage of American phoneticians; but where that usage seems to us inconsistent or inconvenient, we shall not hesitate to suggest symbols of our own. The student who learns to use the symbols here presented should find it easy to master other systems of phonetic writing when he meets them in various textbooks. He need only keep in mind that the important feature of any phonetic alphabet is not the symbols that compose it but the system of classification upon which it is based.

One final caution. When we define a phonetic symbol by saying that it represents the sound heard in such-and-such a word, we do not mean to imply that all pronunciations of that word are alike, even in the same dialect or in the usage of a single speaker. In general, the value of a phonetic symbol is a group or class of sounds, containing an indefinite number of more or less noticeably different members. In other words, our symbols are intended to represent CATEGORIES OF SOUND rather than individual sounds.

2.8. The classification of vowels. The basic classification of vowels is a simple matter. There are three intersecting criteria: the part of the tongue which acts as articulator, the height to which the tongue is raised, and the position of the lips.

FRONT VOWELS, as already noted in §2.5 (3), are produced by raising the front of the tongue in varying degrees toward the hard palate. The vowel in French *patte* 'paw', *par* 'by', and in Boston English *calm, car* is pronounced by pushing the tongue slightly forward while keeping the whole body of the tongue as low as possible in the mouth; we call this a LOW FRONT vowel, and write it [a]. For

the vowel in French *bête* 'beast', *faire* 'do', and for the first part of the vocalic element in London English *fair, there*, the front of the tongue is advanced and raised about one-third of the way toward the hard palate; this is a LOWER-MID FRONT vowel, written [ɛ]. For the vowel in French *été* 'summer' and German *See* 'sea', the front is again advanced and raised about two-thirds of the way toward the hard palate; this is a HIGHER-MID FRONT vowel, written [e]. Finally, for the vowel in French *ici* 'here', *rive* 'shore', and in German *sieht* 'sees', *nie* 'never', the front is advanced and raised nearly as high as possible toward the anterior hard palate, short of forming the kind of constriction that would result in a spirant; this is a HIGH FRONT vowel, written [i].

We have established here four degrees of tongue-height among the front vowels: high, higher-mid, lower-mid, and low. But it is obvious that these four points are parts of a continuum, and that any breaking up of the continuum must be arbitrary and artificial. The only reason for picking out four degrees of tongue-height instead of three or five is that this number appears to give us the best working basis for a useful classification. Later on we shall speak of intermediate grades; for the present, four will be enough to illustrate the principles on which we proceed.

Note that the four vowels [i, e, ɛ, a] are pronounced with the lips neutral or spread; they are UNROUNDED VOWELS.

BACK VOWELS are classified analogously, by the degree to which the dorsum approaches the soft palate. Since most back vowels in the more familiar languages are pronounced with LIP-ROUNDING or LABIALIZATION (i.e. with the lips pursed or protruded), it will be easier to begin our survey with the ROUNDED VOWELS. We distinguish, then, the LOW BACK ROUNDED vowel [ɒ] in London English *Tom, not*; the LOWER-MID BACK ROUNDED vowel [ɔ] in London English *bought, law* (also in many American pronunciations of these words); the HIGHER-MID BACK ROUNDED vowel [o] in French *beau* 'beautiful' and in German *rot*; and the HIGH BACK ROUNDED vowel [u] in French *tout* and in German *gut*.

It is possible also to pronounce front vowels with lip-rounding and back vowels without it; indeed, from the point of view of general phonetics there is no reason to regard this feature as more naturally associated with one series than with the other. The FRONT ROUNDED vowels are the high [ü] in French *lune* 'moon' and in German *kühl* 'cool'; the higher-mid [ö] in French *peu* 'few' and in German *böse* 'bad'; and the lower-mid [ɔ̈] in French *peur* 'fear', *peuple* 'people'. (A rounded counterpart of the low front [a], though easily pronounceable, is not known to occur anywhere in actual use.) The more familiar BACK UNROUNDED vowels are the lower-mid [ʌ] in *cut, run*, and the low [ä] in some pronunciations (especially British) of *calm, father*; the high [ï] (unrounded [u]) and the higher-mid [ë] (unrounded [o]) are common also, though not in the standard pronunciation of the better-known languages.

Not all vowels are articulated by the front of the tongue against the hard palate or by the dorsum against the velum; there is an intermediate series for which the mid-part of the tongue (overlapping the front and the dorsum) approaches the mid-part of the roof of the mouth (overlapping the hard palate and the velum). These are called CENTRAL VOWELS. The high central, midway

between [i] and [ï], occurs in Russian *byl* 'he was'; the high central rounded, midway between [ü] and [u], in Swedish *hus* 'house' and in some Southern American pronunciations of *moon, shoes*; the lower-mid central, between [ɛ] and [ʌ], in London and Boston English *bird, worm*; and the low central, between [a] and [ä], in the most common American pronunciation of *calm, father*.

At this point we have arrived at a system of classification which discriminates twenty-four vowel categories: three series according to the articulator (front, central, back), four according to tongue-height (high, higher-mid, lower-mid, low), and two according to lip-rounding (unrounded, rounded). These twenty-four categories are enough to distinguish the major vocalic types; but for many phonetic purposes it is necessary to draw still finer lines. Accordingly, we set up three intermediate series according to tongue-height, one between every two of the four series already established: a LOWER-HIGH series between the high and the higher-mid; a MEAN-MID series between the higher-mid and the lower-mid; and a HIGHER-LOW series between the lower-mid and the low. (When necessary, the high and the low series can be explicitly distinguished from the contiguous series as higher-high and lower-low respectively.) This refinement of our classification brings the number of vowel categories to forty-two; further subclassification by the same criteria is usually not required.

How are all these sounds to be represented on paper? No phonetic alphabet now in common use provides more than about thirty vowel symbols; and many of these are needlessly complex and finical. For most practical purposes it is enough to have a few letters for strategically placed categories; symbols for the other categories can be derived by combining these letters with a few clear and easily written diacritics. Table 1 shows the symbols we suggest. There are fourteen basic letters: seven for front (unrounded) vowels, seven for back rounded. For front rounded vowels we use the letters of the back rounded column with two dots placed over them; for back unrounded vowels, conversely, we use the letters of the front column with the same diacritic; but for some vowels in these two series we give alternative symbols in common use. Thus [ü] or [y] = rounded [i], and [ï] or [ɯ] = unrounded [u]. For central vowels we use the basic letters with a single dot placed oved them: letters of the front column for central unrounded vowels, letters of the back rounded column for central rounded vowels. Thus [ë] is the unrounded vowel midway between [e] and [ë], and [ȯ] is the rounded vowel midway between [ö] and [o]. Since the letter *i* already has a dot of its own, we write the high and the lower-high central unrounded vowels by drawing a short horizontal bar through the letters for the corresponding front vowels: [i, ɪ].

We claim no special virtues for these symbols except utility and a certain amount of logical consistency. For some of the categories here included there are no commonly accepted symbols at all; for some others there are well-known symbols not shown in the table. Several pairs of equivalent symbols are entered as examples of what the student may expect to find; he will discover other variants as he reads the phonetic literature.

Where it is necessary to indicate still finer distinctions than our forty-two categories provide, the vowel symbol may be followed by a SHIFT SIGN in the

shape of a small arrowhead, pointing to the left for a more advanced variety of the vowel, to the right for a more retracted variety, up for a higher variety, and down for a lower variety. Thus [ɪ˖] denotes a vowel somewhat higher than [ɪ] but not as high as [i].

	FRONT		CENTRAL		BACK	
	Unr.	Rounded	Unr.	Rounded	Unr.	Rounded
High	i	ü=y	i̇	u̇	ï=ɯ	u
Lower-high	ɪ	ü̱	ɪ̇	u̱̇	ï̱	ʊ
Higher-mid	e	ö=ø	ė	o̱	ë=ɤ	o
Mean-mid	E	ɛ̈	Ė=ə	ɔ̇	Ë	ʌ
Lower-mid	ɛ	ɔ̈=œ	ɛ̇	ɔ̱̇	ɛ̈=ʌ	ɔ
Higher-low	æ	ɑ̈	æ̇	ɑ̇	æ̈	ɑ
Low	a	ɒ̈	ȧ	ɒ̇	ä=ɑ	ɒ

Table 1

2.9. Semivowels. Sounds differ not only in quality but also in SONORITY The sonority of a sound is determined primarily by the size of the resonance chamber through which the air stream flows. Thus, a low vowel is more plainly audible than a higher vowel uttered with the same force, and any vowel is more sonorous than any consonant. A sequence of sounds in a normal utterance is therefore characterized by successive peaks and valleys of sonority. The sounds which constitute the peaks of sonority are called SYLLABIC; and an utterance has as many SYLLABLES as it contains syllabic sounds.

When a vowel is uttered alone or contiguous to one or more consonants, it is always syllabic. When two vowels are uttered without hiatus (a break or pause between them), each may be the peak of a separate syllable or the two vowels may belong to the same syllable. The decisive factor is usually the distribution of the stress (see §2.14)—whether each vowel is pronounced with a separate impulse of stress or whether a single impulse extends over both. In the latter case, either the first or the second vowel may be the more sonorous and act as the peak of the syllable; the other is said to be NONSYLLABIC. In French *pays* [pei] 'country', the two vowels are peaks of two separate syllables; in English *pay* [pEI] there is a similar succession of vowels, but only the first is syllabic. Compare also French *Raoul* [ʀaul] 'Ralph' (two syllables) and English *fowl*

[faʊl] (one syllable), French *aérer* [aeʀe] 'ventilate' (three) and English *irate* [aeɪeɪt] (two). A combination of a syllabic and a nonsyllabic vowel is a DIPHTHONG. Thus the combinations [eɪ, aʊ, ae] in the English words just cited are diphthongs, but the dissyllabic combinations [ei, au, ae] in the French words are not. When it is useful to show that a symbol denotes a nonsyllabic vowel, a curve may be placed under the letter as a diacritic, as in [eɪ̯, aʊ̯, ae̯]; but see below.

If we examine a large number of diphthongs, we find that in many typical cases—as in *high, how, hay, go, boy*—the nonsyllabic vowel has a higher tongue position than the syllabic. In view of what we have said about sonority, this is not surprising. It is useful to have a special name for a nonsyllabic vowel with this kind of relation to the contiguous syllabic; we call it a SEMIVOWEL. Nonsyllabic vowels with a lower tongue position than the contiguous syllabic (but rendered less sonorous by receiving a weaker degree of stress) are not usually called by this name; examples are the nonsyllabic [ə] in London English *here* [hɪə] and the non-syllabic [æ̯] in Bavarian German *guat* (= *gut*) [gʊæ̯t].

A semivowel may precede as well as follow a vowel. The initial sounds in *yes, you* and in *well, wall* are generally regarded as consonants, and in fact play a role in the structure of English exactly analogous to that of such unmistakable consonants as [m] and [z] (see Chapter III); but according to the definitions given in §2.6 they are vowels in terms of the criteria we have chosen. Since they are nonsyllabic and have in every case a higher tongue position than the contiguous syllabic vowel, they are most satisfactorily described as semivowels.

The tongue position of a semivowel is not only higher than that of a contiguous vowel, but nearly always more advanced or more retracted as well. The position of the lips may be the same for the semivowel as for the vowel (as in *yes, woo*) or it may be different (as in *you, well*). On the basis of these various possibilities, we group all semivowels into four categories, and provide a cover symbol for each: [j], tongue higher and more advanced than for the contiguous vowel, lips unrounded; [ɥ], the same, but with lips rounded; [ɹ], tongue higher and more retracted than for the contiguous vowel, lips unrounded; [w], the same, but with lips rounded.

These definitions make it clear that a symbol like [j] does not always denote a semivowel of the same absolute tongue-height. The [j] in *year*, where it precedes a high or a lower-high front vowel, must be pronounced with the front of the tongue very considerably raised and advanced; the [j] in *yawn*, where it precedes a low or lower-mid back vowel, can be pronounced with the front relatively low and little advanced. Similarly, the [w] in *woo* must be considerably elevated, retracted, and rounded, whereas the [w] in *well* need not be so high, so far back, or so strongly labialized.

[j] occurs not only in words like *yes, yawn* [jɛs, jɔn] or French *yeux* 'eyes', *fier* 'confide' [jö, fje], but also after vowels in words like *hay, high, boy* [hɛj, haj, bɔj]; for as already stated, the nonsyllabic elements of these diphthongs are semivowels. [ɥ] occurs in French *huit* 'eight', *lui* 'him', *tuer* 'kill' [ɥit, lɥi, tɥe], and also in the stage pronunciation of German *Eule* 'owl', *Beutel* 'bag' [ɔɥlə, bɔɥtəl]. [w] occurs in *wet, wool* [wɛt, wʊl] and in French *oui* 'yes', *Louis* [wi,

lwi], and also in *how, go* [haw, gow] and in German *aus* 'out' [aws]. The back unrounded semivowel is rare.

Semivowels occur voiceless as well as voiced; cf. §2.5 (5) and §2.10 (4). A voiceless [j] (which may be symbolized by a *j* with a bar through it or by any other convenient modification) is often heard in *hue, huge,* and after a voiceless consonant as in *pew, cute* [pjuw, kjuwt]. A voiceless [w] (for which the special symbol [ʍ] is in common use) occurs in some pronunciations of *why, whale* [ʍaj, ʍɛjl], and after a voiceless consonant as in *twice, quick* [tʍajs, kʍɪk].

In all cases except where it is for some reason desirable to indicate the tongue-height of the semivowels with more precision, the cover symbols are to be preferred to such writings as [i̯, u̯], and the like.

2.10. Further analysis of vowels. In §2.8 we classified vowels according to tongue and lip position, and arrived at a system of forty-two categories. Any vowel whatever can be referred to one of these, and can be represented by one of the symbols shown in Table 1 or by an equivalent graph; but it must not be supposed that our classification exhausts all the ways in which vowels can be modified. It will be the purpose of this section to mention a few of the more important modifications, and to suggest means of representing them on paper.

(1) NASALIZATION. From the description of the velum in §2.5 (4) it follows that a sound articulated by any part of the tongue or by the lips—hence any vowel—can be pronounced in two varieties: ORAL, with the velum raised to close the entrance to the nasal cavity; and NASALIZED, with the velum lowered so as to leave this cavity accessible to the air stream. If the mouth passage is unobstructed, as it is for vowels, then in the former case the air flows entirely through the mouth; in the latter case it flows partly through the mouth, partly through the nose.

Nasalized vowels are common in many languages. The nasalization may range from a slight 'nasal twang' (as in the vowel of *man* compared with that of *bad*) to the strong nasal resonance of the vowels in French *vin* 'wine', *cent* 'hundred', *pont* 'bridge', *un* 'one'. Nasalization of vowels is denoted by a hook under the letter, as in [ą].

(2) RETROFLECTION. Front vowels are formed by the front of the tongue, back vowels by the dorsum, central vowels by a part of the tongue between these and overlapping both. While these articulators are functioning, the apex is usually passive, near the bottom of the mouth behind the lower front teeth. But since the apex is capable of independent movement, as noted in §2.5 (2), it is possible to pronounce all vowels with the apex raised toward the upper teeth or even curled up and back to point toward the alveolar ridge or the hard palate. Vowels so formed are called retroflex, and are marked by a dot under the letter, as in [ạ].

Retroflex vowels occur in many types of American English (except in eastern New England and parts of the Old South) in words like *hard, board, poor.* The most common of these is the mid central retroflex vowel in *bird, worm,* and the like; for this, many phoneticians use a special symbol [ɚ].

(3) TENSION. The vowels in English *see* and French *si* 'if' are both high front, and may therefore both be written [i]; similarly, the vowels in English *do* and French *doux* may both be written [u]. Nevertheless there are several differences between the English and the French vowels; above all, the French ones are pronounced with noticeably greater tension of the muscles in the articulating organs. This is characteristic of most French vowels as compared with the nearest English correspondents: where in English the lips, the tongue, and the other organs are more or less relaxed, in French they are tense. Even within English some vowels are tenser than others; thus the vowels in *feel* and *fool* are not only higher, longer, and somewhat more diphthongal than the ones in *fill* and *full*, but also pronounced with greater muscular tension.

When necessary, TENSE and LAX vowels may be distinguished by contrasting diacritics below the letter—say by a small square with one side missing, the open side at the bottom for tense vowels, at the top for lax.

(4) VOICE. We observed in §2.5 (5) that nearly all sounds can be pronounced with the vocal cords in various positions, and can thus be made voiced or voiceless, murmured or whispered. Vowels are typically voiced (cf. §2.6); but voiceless vowels play a part in many languages, quite apart from the use of murmur and whisper in certain abnormal situations. All glottal modifications of vowels differing from ordinary voice may be indicated by diacritics below or after the letter; for voicelessness we suggest a small inverted v in that position, as in [$a_{\wedge}$].

The consonant [h], which we have described in §2.5 (5) as a glottal spirant and which we shall so classify in §2.11, can be alternatively regarded as a voiceless vowel, or rather as a cover term for all voiceless vowels. (Note that in words like *he, ham, hoe, who*, the tongue and lip position for [h] is almost or quite the same as for each following vowel.) The decision to treat it instead as a consonant is dictated by practical usefulness.

2.11. The classification of consonants. In §2.4 we defined the four fundamental consonant types as stops, spirants, laterals, and trills. In §2.5, we saw that these types can be articulated by five organs in various positions. By combining the two principles of classification, we get a clear and simple way of discriminating the major consonantal categories.

With the exception of the glottal stop, all consonants can be pronounced either voiced or voiceless, and either oral or nasalized. Among nasalized consonants, the nasalized stops occupy a position of special importance because of their frequent occurrence and their exceptionally great acoustic difference from the corresponding oral types. In most kinds of nasalized sounds the air stream flows out partly through the nose, partly through the mouth; but when the mouth passage is completely stopped and the velum is lowered to expose the entrance to the nasal cavity, the entire air stream flows through the nose. It is useful, therefore, to set up nasalized stops as a separate category, called NASALS, parallel to stops, spirants, laterals, and trills.

Table 2 summarizes the basic classification of consonants. The five rows accommodate the five articulatory types just mentioned; the five columns divide these types according to the articulating organ involved: the lower lip, the apex,

the front of the tongue, the dorsum, and the vocal cords. Of the twenty-five compartments resulting from the intersection of these rows and columns, only twenty-one are of practical importance; for no trill can be articulated by the front of the tongue, and no nasal, lateral, or supraglottal trill by the vocal cords. On the other hand, some of the compartments accommodate more than one category of sounds.

	LABIAL	APICAL	FRONTAL	DORSAL	GLOTTAL
Stops.....	p b	t d	c ɟ	k g	ʔ
Spirants.....	ɸ β, f v	θ ð, s z, ʂ ʐ	š ž	x ɣ	h ɦ
Nasals.....	m	n	ɲ	ŋ	none
Laterals.....	ʟ	l	ʎ	ʟ	
Trills.....	ʀ	r	none	ʀ	

TABLE 2

The table presents also a set of phonetic symbols with which the various categories can be represented. In the first two rows, each pair of symbols denotes the voiceless and the voiced variety of the same type. (Since the glottal stop is by definition never voiced, the symbol for it has no partner.) In the other rows, the symbols denote only voiced sounds; the voiceless varieties can be written by adding the diacritic for voicelessness mentioned in §2.10 (4), or by drawing a short bar through the letter, as in [ɬ] for voiceless [l]. The compartments for labial laterals and labial trills are provided with symbols merely for the sake of theoretical completeness; sounds of these categories play no part in any known language.

In the compartment for labial spirants there are two pairs of symbols: [ɸ β] for bilabial spirants, [f v] for labiodental. In the compartment for apical spirants there are three pairs: [θ ð] for slit spirants (usually dental), [s z] for groove spirants formed with the blade, [ʂ ʐ] for groove spirants formed with the point; cf. §2.5 (2).

The categories defined by this table include all possible consonant articulations, but do not discriminate more than the chief types. Thus, the category of apical stops includes the strongly aspirated alveolar [t] of English *too*, the dental [t] of French *tout*, and even the clicking sound spelled *tsk tsk* which we use as an interjection of mild or jocular commiseration. It must be understood that the categories we set up will always include an indefinite number of distinct varieties, and that no matter how far we divide and subdivide each category, the smallest one we arrive at will still be susceptible of further division. The same principle governs the use of the phonetic symbols here provided, or of any others.

No phonetic alphabet can be devised with a separate symbol for every separate sound; and even a fair approximation to such an alphabet would be impossibly cumbersome. All we need are enough symbols to distinguish the chief consonantal types; wherever it is necessary to discriminate two or more varieties of the same type, this can easily be done by modifying the basic symbol or by adding diacritics.

Each of the columns in Table 2 corresponds to one of the articulating organs. As already noted, the first four of these organs can touch or approach several different points of articulation; thus, the apex can be raised toward the edge or back of the upper teeth, the alveolar ridge, or the hard palate. It is useful to have a device for distinguishing sounds of the same type formed by the same articulator in different positions. We recommend for this purpose two diacritics under the letter (or over when this position is more convenient): a curve [̼] for sounds formed in the most advanced position which the articulator can occupy, and a dot [̣] for sounds formed in the most retracted position; sounds formed in the intermediate position require no special mark. Thus, [t̼] denotes a voiceless DENTAL (interdental or postdental) stop, [t] an ALVEOLAR stop, [ṭ] a CACUMINAL stop. Symbols in the frontal column can be similarly made to represent PREPALATAL, MEDIOPALATAL, and POSTPALATAL varieties; and symbols in the dorsal column can be made to represent PREVELAR, MEDIOVELAR, and POSTVELAR varieties. Labial symbols without a diacritic denote BILABIAL sounds; with a dot they denote LABIODENTAL sounds; with a curve, consonant sounds articulated by the pursed or protruded lips, like [p] in French *pure* 'pure' as compared with *pire* 'worse'. (Instead of using [ɸ β] with a dot for labiodental spirants, it is easier to use the ordinary letters [f v].) Although the vocal cords cannot articulate in more advanced or retracted position, the same diacritics can be used with [ʔ] and with [h ɦ] to denote, respectively, PHARYNGAL sounds (since these are formed higher up in the throat, though by a different organ) and LARYNGAL sounds (formed by a constriction of the entire larynx).

The use of these diacritics triples the number of consonantal categories shown in Table 2. We shall increase the number still further by adding one more horizontal row.

When the passing air current causes one of the supraglottal organs to vibrate (cf. §2.4), the vibration may be so short that only a single tap is produced instead of the series of taps which we have defined as constituting a trill. Such a sound is called a FLAP. An alveolar flap is heard in London English *very*, *marry*, and the like, and in American English very often in place of [t] in words like *Betty*, *matter*. The frequent occurrence of flaps in the languages of the world makes it convenient to include them as a separate category in our expanded table. They can be written by adding a diacritic—say a superior figure [ˡ]—to the trill symbols.

An important difference between the apical flap and an apical stop [t] or [d] is that the latter is formed by touching the roof of the mouth with the upper surface of the apex (the blade), whereas in [rˡ] it is the under-side of the apex which touches the teeth or the alveolar ridge at the moment of contact.

Table 3 is an expanded version of Table 2, but does not differ from it in

	LABIAL			APICAL			FRONTAL			DORSAL			FAUCAL		
	Protruded	Bilabial	Labiodental	Dental	Alveolar	Cacuminal	Prepalatal	Mediopalatal	Postpalatal	Prevelar	Mediovelar	Postvelar	Pharyngal	Glottal	Laryngal
Stops															
Spirants															
Nasals													none		
Laterals															
Trills							none								
Flaps															

TABLE 3

principle. The number of columns is increased to fifteen by dividing each of the basic columns according to typical points of articulation; the number of rows is increased to six by adding a separate row for flaps. The term FAUCAL is used as a cover term for pharyngal, glottal, and laryngal sounds, all produced in the throat (Latin *faucēs*). The compartments have been left empty; all of them can be filled by using the thirty-six symbols of Table 2, alone and in combination with the diacritics here suggested.

2.12. Syllabic consonants. Just as a vowel is not always the peak of a syllable (see §2.9), so a consonant, when it is more sonorous than the other consonants around it or when it is followed or preceded by silence, may be syllabic. In the usual pronunciation of *apple, rhythm, button*, the second syllable of each word is without a vowel; the consonants [l, m, n], being more sonorous than the preceding stop or spirant and of course more sonorous than the following silence, are the peaks of their syllables. SYLLABIC CONSONANTS are most often nasals, laterals, or trills; but almost any consonant may on occasion be syllabic. A syllabic [s] appears in the interjection *pst*; and in a common relaxed pronunciation of *Howdy do* [hawd dʊw], the first [d] often constitutes a separate syllable. Where necessary, syllabic consonants are marked by a small circle under the letter, as in [n̩].

It may be taken as a safe rule-of-thumb that if a vowel and a consonant occur in the same syllable, it is always the vowel and never the consonant that is syllabic. Thus, if in the word *beckon* any vowel intervenes between the [k] and the [n]—no matter how short or how weak the vowel may be—that vowel and not the [n] is the peak of the syllable.

2.13. Further analysis of consonants. As in the case of vowels, our basic classification of consonants falls far short of exhausting the ways in which these sounds can be modified. The division of all consonants into voiced and voiceless, and into oral and nasalized, has already been mentioned in §2.11. Further, the remarks in §2.10 concerning muscular tension are as applicable to consonants as to vowels. Consonants pronounced with relatively strong force and muscular tension are called FORTIS; those with relatively weak force and tension, LENIS. They can be distinguished in writing by the same diacritics used for tense and lax vowels.

The rest of this section will discuss four further criteria for the description of consonants. The third and fourth apply especially to stops.

(1) COARTICULATION. It is customary to define a sound by describing only the movement or position of the organs directly involved in its articulation, leaving the concurrent activity of the other organs unspecified. Thus we describe the [k] in *calm* and *crude* only by saying that the dorsum forms an occlusion against the mid-part of the velum, that the velum is raised, and that the glottis is open. But while the dorsum is busy in this way, the other organs—the lips, the apex, and the front—do not simply cease to exist. Each of them is in a certain position or performing a certain movement; and a complete description of [k] or of any other sound would require that all the organs be accounted for. In many cases, to be sure, the position of the organs not involved in the primary articulation has little effect on the acoustic result, and may safely be passed over as 'neutral' or 'passive'; but very often the activity of one or several of these organs has a marked effect on the resulting sound, and serves to differentiate varieties otherwise identical.

This can be illustrated by the two [k]'s in *calm* and *crude*. Both are formed alike as to their primary articulation; but the concurrent activity of the other organs—what may be called the secondary articulation or COARTICULATION—is strikingly different. For the [k] in *calm*, the lips are parted rather wide (but not rounded), the apex is near the bottom of the mouth behind the lower front teeth, the front is depressed; all these positions anticipate the articulation required for the following vowel. For the [k] in *crude*, the lips are slightly rounded and protruded, the apex is raised or curled back, the front is somewhat raised; again these positions anticipate the articulation of the following sounds, the [ɹ] and the vowel. The student should test the effect of this difference in coarticulation by pronouncing the two [k]'s alone: start to say each word, as naturally as possible, but stop short immediately after the initial consonant.

Differences in coarticulation are not always due to the anticipation of different following sounds. In London English (less clearly in most dialects of American English), the two [l]'s in *lull* or in *little* are noticeably differentiated by the coarticulation of the front and the dorsum, though the primary articulation of both is that of an alveolar lateral. For [l] before a vowel, the front is lightly raised toward the hard palate and the dorsum slopes down behind it; the contour of the tongue, from apex to root, is a smooth curve. For [l] at the end of a word, the front is slightly depressed and the dorsum is raised toward the velum; the contour of the tongue resembles a shallow valley between two peaks. Ger-

man [l] in all positions (as in *leben* 'live', *voll* 'full') differs from both kinds of English [l] in having the front raised still closer to the hard palate.

Six principal kinds of coarticulation can be usefully distinguished. Two or more kinds can occur together. The easiest way of representing this feature is to place after the letter a small inferior symbol suggesting the kind of articulation involved; appropriate symbols are offered in the following list.

LABIALIZATION. Any except a labial sound can be accompanied by lip-rounding or labialization (cf. §2.8). [t_w] = labialized [t]; similarly, [i_w] = labialized [i], a vowel with more lip-rounding than [i] but with less than [ü]. If it is necessary to indicate absence of lip-rounding (delabialization) in a sound usually pronounced with rounding, the inferior [$_w$] may be inverted.

RETROFLECTION. Any except an apical sound can be accompanied by a raising or inversion of the apex (cf. §2.10). [k_r] = retroflex [k]. (The same diacritic can be used also for retroflex vowels, in place of the subscript dot recommended in §2.10.)

PALATALIZATION. Any except a frontal (palatal) sound can be accompanied by a raising of the front toward the hard palate; various degrees of raising may be distinguished. [p_j] = strongly palatalized [p], [p_i] = weakly palatalized [p], [l_i] = German [l], [l_e] = London English [l] in *let*.

VELARIZATION. Any except a dorsal (velar) sound can be accompanied by a raising of the dorsum toward the velum; again, various degrees may be distinguished. [b_x] = strongly velarized [b], [b_u] = weakly velarized [b], [l_u] or [l_o] = London English [l] in *tell*.

PHARYNGALIZATION. Any except a pharyngal sound can be accompanied by a constriction of the pharynx. [m_q] = pharyngalized [m].

LARYNGALIZATION. Any except a laryngal sound can be accompanied by a constriction of the larynx, effected by tightening the entire musculature below and around the vocal cords. [t_h] = laryngalized [t]. The sounds treated in Table 3 as laryngals are more strictly described as laryngalized glottal sounds.

(2) DEGREE OF APERTURE. The constriction for spirants (§2.4) may be relatively narrow or wide, causing the air stream in its passage through the aperture to set up relatively great or little friction. The groove-shaped aperture for English [s] is usually narrow, and the strong friction of the passing air stream, combined with the splitting of this stream against the edge of the lower front teeth, gives our [s] its characteristic sibilance. On the other hand, the slit-shaped aperture for English [ð] is usually rather wide, so that this sound often has little audible friction. (The Danish variety of [ð] has even less.) The lateral opening for [l, ʎ, ʟ] may also be relatively narrow or wide; and even trills may be formed with different degrees of clearance between the roof of the mouth and the articulator (the vibrating apex or the dorsum cradling the vibrating uvula). Laterals accompanied by friction are common in many languages; a fricative trill is familiar to many of us in the name of the Czech composer *Dvořák*. All these categories—spirants, laterals, and trills—can therefore be subdivided into a NARROW and a WIDE variety according to the relative distance between the articulating organ and the point of articulation. It is granted, of

course, that such a division is quite arbitrary, and that no sharp line can be drawn between the two varieties; again it is practical usefulness that justifies our procedure.

The two varieties can be distinguished by diacritics. We suggest a small raised plus-sign [ʰ] after the letter for the narrow variety, a small raised equal-sign [ˢ] in the same position for the wide. In order to prevent the transcription from becoming cluttered with needless marks, we recommend that these diacritics be used only when the degree of friction is of special significance or when it is different from the degree usually implied by the unmodified symbol in the language being transcribed. Thus, a fricative English [s] is sufficiently characterized by the plain letter; [sʰ] should be reserved for instances with exceptionally strong or noticeable friction or for the transcription of languages where [s] is usually wide.

When both wide and narrow varieties of laterals or trills occur frequently in a language, and especially when the difference between them is important, it is convenient to use special symbols for the latter variety instead of the combinations suggested above. Any symbols will serve, provided they are not used for anything else and are carefully defined in the value they are to have.

(3) INNER CLOSURE. A stop is a sound during whose production the air current is momentarily (or longer) imprisoned behind an occlusion in the larynx or the oral passage. An important fact, usually taken for granted and hence overlooked, is that the chamber in which the air is pent up has an INNER CLOSURE as well as an outer one. In the most common type of stops this inner closure is at the bottom of the lungs, and the air chamber extends from the diaphragm to the point where the outer closure is articulated. But this large chamber is not the only kind possible. By forming a glottal stop simultaneously with an oral occlusion, we reduce the length of the air chamber to the distance between the larynx and the point of articulation; by forming simultaneously two oral occlusions—one with the dorsum and the other with the front, the apex, or the lips—we reduce the size of the chamber still more.

Stops with inner closure at the bottom of the lungs are called PULMONIC; those with inner closure at the glottis, GLOTTALIC; and those with inner closure between dorsum and velum, VELARIC.

The outer closure may be broken by pressure or by suction. (For types of release see below.) The imprisoned air may be compressed by an upward or forward movement of the organ at the point of inner closure, so that when the outer closure is broken there is a small explosion or expulsion of air from the mouth. Or the air may be rarefied by a downward or backward movement of the organ at the point of inner closure, so that when the outer closure is broken there is a small inrush of air into the mouth. Accordingly we distinguish between PRESSURE STOPS and SUCTION STOPS.

In normal speech, English [p, t, k, b, d, g] are all pulmonic pressure stops: the pent-up air is compressed by an upward movement of the diaphragm. Pulmonic suction stops are formed by pronouncing [p, t] and so forth on the indrawn breath; the occasional INSPIRATED utterance of *O.K.* contains a pulmonic

suction [k]. Glottalic pressure stops (usually called simply GLOTTALIZED STOPS) are made by forming simultaneous glottal and oral closures and then raising the entire larynx sharply while both closures are still intact; glottalized stops cannot be voiced. Glottalic suction stops (sometimes called IMPLOSIVES, a misleading name) are formed analogously, but by lowering instead of raising the larynx; they may be either voiced or voiceless. (In the voiced variety the glottal stop is replaced by the glottal constriction required for voice. The speed with which the larynx is lowered is enough to rarefy the air in the supraglottal chamber, in spite of the small flow of air up from the lungs between the vibrating vocal cords.) Velaric pressure stops are rare; they are made by pushing the dorsum forward while both the dorsal and the outer closure are maintained. Velaric suction stops are the well-known CLICKS, made by drawing the dorsum back while again maintaining both closures. To all but the speakers of certain South African languages in which clicks figure as regular speech sound, the most familiar click is the bilabial, or kiss; other clicks are occasionally used by speakers of English as interjections (*tsk tsk*; clucking to a horse). Note that breathing can continue unchecked during the production of velaric stops.

Pulmonic pressure stops are written with unmodified letters, as [p, b], etc. All other types can be distinguished by raised diacritics over or immediately after the letter: [p˃] = pulmonic suction stop; [p'] = glottalic pressure stop or glottalized stop; [p''] = glottalic suction stop or implosive; [p˅] = velaric pressure stop; [p˄] = velaric suction stop or click.

Although this classification is most useful for the description of stops, it applies equally to spirants, and at least in theory to the other consonants as well.

(4) RELEASE. When the outer closure of a stop is broken, the articulating organ may be withdrawn sharply and cleanly from the point of articulation, and the following sound may begin simultaneously with the release of the occlusion, as in French. This is called SHARP RELEASE, in contrast with other types, which result in various transition sounds intervening between the stop and the following vowel or consonant. Diacritics denoting types of release are small raised marks placed immediately after the stop symbol.

ASPIRATION. In the formation of a pulmonic pressure stop, the compression of the pent-up air may be slight, producing only a very weak explosion, or it may be considerable; the degree of compression depends of course on the amount of pressure exerted by the diaphragm. When the pressure is great, the release of the occlusion is followed by an outrush of air, often described as a 'puff of breath'. This is ASPIRATION, and stops formed in this way are ASPIRATED. Aspiration may follow both voiced and voiceless stops, though it is more common after the latter kind; several degrees can be distinguished. [tʿ] = aspirated [t], [tʰ] = [t] with exceptionally strong aspiration; [t⁼] = unaspirated [t], explicitly marked in this way only when it is necessary to indicate the lack of aspiration in a sound usually aspirated. (In a preceding paragraph the diacritic [⁼] was used to distinguish wide sounds from narrow. The two uses can never cause any confusion, since the symbol to which the diacritic is attached will always show whether it means wide aperture or non-aspiration.)

A simple test for aspiration is to pronounce a word containing the sound in a low voice, with the back of the hand held about an inch from the lips. If the sound is aspirated, there will be a plainly felt blast or puff against the skin of the hand. Apply this test to the stops in English *pool, tool, cool,* and compare these with the stops in *spool, stool, school.*

AFFRICATION. If the articulating organ is withdrawn slowly from the point of articulation, a momentary constriction is formed between the occlusion and the complete release; the pent-up air, escaping through the aperture, produces a spirant homorganic with the stop (i.e. formed by the same organ at the same point of articulation). Spirantal release of this kind is AFFRICATION; the combination of a stop and a following homorganic spirant is an AFFRICATE. The precise quality of the affrication can be shown in writing by using the appropriate spirant symbol as a diacritic: [p^{Φ}, p^{f}] = two kinds of affricated [p]; [b^{β}, b^{v}, t^{θ}, t^{s}, $t^{š}$, d^{z}, k^{x}] and the like = various affricates. As a cover symbol for all kinds of affrication we can use a raised plus-sign: [p^{+}, b^{+}, t^{+}, d^{+}], etc. (On the double use of this diacritic, see the parenthetical remark on [$^{-}$] above.) It is often useful to have unit symbols to replace these combinations; any letter not otherwise employed in a particular transcription can be used for this purpose. Thus [c], entered in Table 2 as a symbol for the voiceless frontal stop, is often used in the value of [t^{s}] or [t^{+}].

NASAL RELEASE. When the air is imprisoned between an outer closure and any inner closure except the velaric, the velum is necessarily raised, since otherwise the air could escape through the nose. If, during the formation of a pulmonic or a glottalic pressure stop, the velum is lowered before the outer closure is released, the explosion takes place into the nasal cavity and out through the nostrils. This NASAL RELEASE may be symbolized by [^{N}]: [t^{N}] = nasally released [t]. In English, stops are usually released through the nose when followed by a homorganic nasal, as in *topmost* [-pm-], *button* [-tn̩], *madness* [-dn-]; but here the nasal release need not be specially marked, since it is already implied by the following consonant.

To convince himself that the release in this position is really nasal, the student should use his mirror to observe the position of the tongue while pronouncing the word *Hottentot* [-tn̩t-]. The apex remains in contact with the alveolar ridge from the beginning of the first [t] to the end of the second; the release of the first [t] is through the nose, as the student can prove to himself by uttering the word while holding his nostrils shut.

LATERAL RELEASE. While the articulating organ maintains contact with the roof of the mouth in the median line, the outer closure can be released by forming a lateral opening. LATERAL RELEASE is symbolized by a superior [^{L}]: [t^{L}] = laterally released [t]. This kind of release is usual for English [t, d] before [l], as in *atlas, oddly*; but again it need not be specially marked here. The student can prove the presence of lateral release by watching his tongue as he pronounces *addled* [-dl̩d] and observing that the apex remains in contact with the alveolar ridge from the beginning of the first [d] to the end of the word. In describing languages where sounds of the type of [t^{L}, d^{L}] do not depend on a following

lateral consonant, it is usual to call them lateral affricates. A Greek lambda [λ] is often used as a unit symbol in place of [dˡ].

Still other kinds of release are possible, and may be symbolized in analogous ways. Sometimes it is useful to indicate whether the first of two successive stops is SEPARATELY RELEASED, like the [k] in French *acte* 'action', or UNRELEASED, like the [k] in the usual pronunciation of English *act*. The former may be written [k°], the latter [k'], as in [ak°t, æk't]. The diacritic for unreleased stops is handy also to distinguish final stops in which the occlusion is maintained until after the end of phonation, as it very often is in English; thus *Help!* is either [hɛlp°] or [hɛlp'].

As we distinguish various kinds of release in stop consonants, so we distinguish also various kinds of ONSET, or ways of beginning the occlusion. In general, the kinds of onset correspond to the kinds of release just described, and need no further comment. They can be symbolized by placing the appropriate diacritic before instead of after the letter. An important special kind of onset is PREASPIRATION, a short expulsion of breath immediately before the occlusion: ['t] = preaspirated [t].

2.14. Prosodic features. So far we have been considering sounds in isolation. An utterance in actual speech, however, is always more than merely a succession of vowels and consonants, following one another in a certain order. Over and above these there are particular variations in the length of individual sounds, in loudness, and in voice pitch—as much a part of the utterance as the segmental sounds, and in many languages just as important. These variations constitute the PROSODIC FEATURES of QUANTITY (length), STRESS (loudness), and TONE (pitch); the last two are usually grouped together as features of ACCENT. At the end of this section we shall discuss briefly the related phenomenon of JUNCTURE.

(1) QUANTITY. It is customary to speak of long and short vowels or (for some languages) of long and short consonants; but such a division, from the purely phonetic point of view, is neither possible nor in accord with the facts. Between the shortest short vowel and the longest long, there is a continuous series of infinite gradations. In some similar situations—thus in the classification of vowels by tongue-height (§2.8)—it is possible to break up a continuum into practically useful sections by arbitrarily selecting certain points of reference; but in the matter of length no general scheme of classification has ever been devised. Nevertheless, the length of vowels and consonants is an important feature of many languages, and we must find a way to deal with it. Provided that when we classify sounds by length we always have in mind a specific purpose to which the system of classification is adapted, and provided that we have no illusions about the phonetic accuracy or the universality of our groupings, we can proceed here as fruitfully as in our analysis of vowel quality or of any other feature.

Since no generally applicable classification is possible, it is pointless to offer a set of terms and symbols. For one purpose it may be enough to distinguish only long and short; for another it may be necessary to distinguish overlong, long,

half-long, short, and half-short. Where only two grades are to be represented in a transcription, it is customary to leave the short sounds unmarked and to mark the long sounds with a raised dot after the letter, as in [a·, m·].

(2) ACCENT. What we have said about the difficulty of classifying degrees of length applies to stress and tone as well. In the utterances of any speech community or of any single speaker, the objective degrees of loudness and levels of pitch form a continuous series of infinite gradations. Just how this continuum is to be broken up, just what grades of stress or of tone are to be distinguished and marked in the transcription, will depend in every case on the internal economy of the language and on the specific purpose we have in view.

Thus, to describe isolated English words it is not necessary to mark tone, but we must distinguish several degrees of stress; *import* with a louder stress on the first syllable is different in meaning from *import* with a louder stress on the second, but either of these words means the same thing whether pronounced with a rising or a falling tone. To describe Japanese words, we need to distinguish only a higher and a lower tone, but no differences in stress; [hana] with even tone means 'nose', with higher tone on the first syllable 'beginning', with higher tone on the second syllable 'flower'. To describe Norwegian words, we must observe both stress and tone; *axel* 'shoulder' and *axel* 'axle' are stressed alike, but differ in the contour of the voice pitch. Finally, to describe French words, we may disregard both kinds of accent.

The degree of stress depends primarily on the force with which air is expelled from the lungs, secondarily on the energy with which the articulation is performed, on muscular tension, and on some other features—sometimes also in part on the pitch of the voice. Different grades ('loud', 'half-loud', 'strong', 'weak', etc.) are commonly indicated in writing by placing a short vertical tick above or below the line before the beginning of the stressed syllable; but accent marks over the vowel letters are also used: *elevate* ['ɛlə,vɛjt] or [ɛ́ləvɛ̀jt], *discrimination* [dɪs,kɹɪmɪ'nɛjšn̩] or [dɪskɹɪ̀mɪnɛ́jšn̩].

The pitch depends, as already explained in §2.5 (5), on the tension of the vocal cords and on the consequent rate of their vibration. Though it plays no part in the structure of isolated English words, tone is of the very greatest importance in English grammar. Compare the sentences *He's out!* with falling pitch at the end; *He's out?* with sharply rising pitch; and *He's out, they say.* with falling pitch on *say* and a rather high, slightly falling or slightly rising pitch on *out.* Tone levels (higher and lower) and tone contours (rising, level, falling, etc.) may be indicated by accent marks over the letters, by superior numerals with assigned values, or by other devices.

(3) JUNCTURE. In connected speech, sounds occur in sequences of two or more, which it is often no easy matter to break up neatly into their constituent fractions. Phenomena relating to the way in which sounds are joined together are summarized under the term JUNCTURE. Languages differ in their junctural habits as they do in other ways: in one language, the transition from sound to sound may be sharp and distinct; in another, sound may flow into sound with no clear line of demarcation between them; and in some languages, juncture

differences may be among the important features which the phonetician must recognize and describe.

Since juncture phenomena have as yet been little studied, and since no general theory or plan of classification has been worked out, we can do no more at this point than illustrate a few of the juncture differences existing in English; an interpretation of these facts will be attempted in §3.7. *A name* contains the same sequence of vowels and consonants as *an aim*, [ənEjm], but the two phrases differ in the juncture between [n] and the following vowel; a similar difference distinguishes *I laid* from *I'll aid* [ajlEjd], *see the meat* from *see them eat* [sɪjðəmɪjt], *why choose* from *white shoes* [ʍajtšuwz]. Again, *minus* and *slyness* both end, in the pronunciation of most American speakers, in the sequence [-ajnəs]; but the two usually do not rime, because they differ in the juncture between the diphthong of the first syllable and the following [n]: in *minus* the juncture is CLOSE, in *slyness* (as attested by the greater length of the diphthong) it is OPEN. The three words *nitrate, night-rate,* and *dye-trade* illustrate three ways of joining sounds in the sequence [-ajtɹ-].

2.15. Phonetic transcription. A PHONETIC TRANSCRIPTION aims to record as accurately as possible all features of an utterance or a set of utterances which the writer can hear and identify in the stream of speech. The more highly trained the writer is, the more closely his transcription approximates a complete record of the gross phonetic facts; but it can never be perfect. The best phonetician alive cannot discriminate among all objectively different sounds; and even the most painstakingly minute record usually neglects to indicate such features as tempo, the relative length of pauses, and individual voice quality. Moreover, since no one can hear distinctions which he has not been trained to recognize (either by the demands of his native language or by the study of phonetics), the completeness of any transcription depends entirely on the accident of the writer's background: no two listeners, regardless of their competence, will ever transcribe all utterances exactly alike. At its best, a phonetic transcription is IMPRESSIONISTIC: it claims no more than to record the writer's impression of the way the utterance sounded to him.

The scientific usefulness of a phonetic transcription, then, is limited. For nearly all purposes it is better to use a PHONEMIC transcription, which represents the sounds of the language organized into a few dozen distinctive units (see Chapter III); but there are certain purposes for which a phonetic transcription is genuinely useful.

One such purpose is the comparison of closely related dialects. The dialectologist finds that very often the pronunciation of one region or locality differs from that of another in ways which involve no corresponding differences in structure (phonemic differences, §3.1); and in order to represent the characteristic regional or local features of pronunciation, he must use a purely phonetic transcription, sometimes with a very finely graded alphabet. Examples can be found on almost every map of the Linguistic Atlas of New England, or of the forthcoming Linguistic Atlas of the South Atlantic States. In western New England, the vowel of *bird, worm,* and the like is strongly retroflex; in parts of

central New England it is also retroflex, but much more weakly so, and this difference is one of the surest criteria for establishing the dialect areas within the region; but the phonemic analysis of the two pronunciations is the same. In the South, the Piedmont region of Virginia and North Carolina is divided into clearly defined sections by the pronunciation of the vowel in *past, calf*, and the like; but here again the differences are without structural significance. Yet all these distinctions, and many others on a purely phonetic level, are of the greatest importance to linguistic geography and dialectology, and to historical grammar as well.

Another purpose which only a phonetic transcription can fulfill is to record one's first hearing of a foreign language, before one has gathered enough material to know what features of the pronunciation are distinctive in that language (§3.1). Every first record, and every record for some days or even weeks after the first, must be entirely phonetic; a phonemic transcription can be worked out only after long and careful study, and only on the basis of a large body of material recorded impressionistically. The final goal of nearly all phonetic work should be to discover the simplest possible description of a language in terms of its phonemes; but unless the phonetics of the language have been minutely observed and scrupulously recorded, the resulting phonemic description will be worthless.

CHAPTER III. PHONEMICS

3.1. Phonemic analysis. A phonetically trained foreign student of English, recording the utterances of an informant, is likely to observe many differences of which the average speaker of English is unaware. He will record an aspirated [pʻ] in *pin* and *appear*, an unaspirated [p⁼] in *spin* and *upper*, an unreleased [pˈ] in *napkin* and (occasionally) in *up*. He will note that the vowel of *bid* is longer than the vowel of *bit*, and that a similar difference obtains between the vowels of *bet*, *bat*, *but* and those of *bed*, *bad*, *bud*. He will distinguish the prevelar [ĝ] of *geese* and *give* from the mediovelar [g] of *goose* and *gone*; the weakly palatalized or neutral [l] of *let* from the velarized [l$_u$] of *tell*; the short [n] in *hence* from the longer [nˑ] in *hens*. And if his ear is sharp enough (that is, if he has been well enough trained), he may record half a dozen different vowel shades in successive utterances of *dog*. In the early stages of his work, of course, he will not know that these utterances all contain one and the same word: for all he can tell, [dɒg], [dɷg], and [dɔg] may be as different from each other as they are from [dʌg]. This uncertainty cannot be resolved simply by asking the informant. If the latter is sophisticated enough to understand such finespun questions, he is probably literate in his native language and hence likely to be misled by the way in which words are written, by the tradition of the schools, and by other equally fallible guides; and if he is unspoiled by education, the chances are that questions about the identity of words will only baffle him.

The only safe and sure way of learning which of the many observable phonetic differences in a language serve to distinguish meanings is to gather as much material as possible and to subject this material to thorough scrutiny. When he does this, the student will discover that certain sounds, such as [pʻ] and [b], occur in similar positions—say at the beginning of utterances—and are therefore in contrast with each other; but that certain other sounds, like the three varieties of [p] mentioned above, normally do not occur in similar positions and hence cannot be used, in English, to keep different meanings apart. He will find that [ĝ] stands only before front vowels, where [g] never appears; that the difference in length between otherwise identical or closely similar vowels is correlated with a difference in the following consonant (longer vowels before voiced consonants, shorter before voiceless), and so on. On the basis of such discoveries, the student is able to divide all phonetic differences observable in the language into two kinds: DISTINCTIVE DIFFERENCES or CONTRASTS, capable of distinguishing one meaning from another; and NONDISTINCTIVE DIFFERENCES, never used for this purpose.

This examination of the phonetic material with a view to sorting out the distinctive differences we call PHONEMIC ANALYSIS. Thanks to this process we are able to organize the infinitely many sounds heard in the utterances of a speech community into a limited number of classes—from fifteen or twenty to about sixty, depending on the language—called PHONEMES. The sounds which constitute a single phoneme are phonetically similar, in the sense of sharing some feature of articulation or some combination of features (resulting in a charac-

teristic auditory effect) absent from the members of all other phonemes. Such phonetic differences as may exist among the members of one phoneme are nondistinctive; but every phoneme as a whole contrasts in at least some positions with every other phoneme.

When all the sounds of a language—including not only the vowels and consonants but also features of juncture and accent—have been classified into phonemes, we obtain a set of structural units in terms of which the entire vocabulary and grammar of the language can be most simply and accurately described.

3.2. The reason for phonemics. But what is the advantage of describing a language in terms of these units? Is not a purely phonetic description, based on a minute record of all the observable differences, just as good, and more accurate into the bargain?

As pointed out in §2.15, the accuracy claimed for a phonetic transcription is mostly an illusion. The degree to which it approximates the gross phonetic facts must always depend on the accident of the writer's training. We can never be sure that his training has made him aware of the particular distinctions that happen to be important in a given language, and hence we can have no guarantee that he has taken account of them in listening to his informant. If he has in fact overlooked any of these distinctions, the omission can be brought to light only by a careful correlation of the observed phonetic differences with differences of meaning.

But even granting that he has not been guilty of such omissions, and assuming that his transcription reflects every detail of the actual utterances as faithfully as anything can, short of a mechanical reproduction, a purely phonetic description of the language is still inferior to a description in phonemic terms. It may or may not err in telling us too little; but it is quite certain to err in telling us too much. Instead of giving us a clear picture of the language, it complicates the vocabulary and obscures the grammar with a profusion of incidental and irrelevant particulars, significant of nothing but the acuteness of the writer's ear. It tells us, for example, that the words *geese*, *goose*, and *base* begin with three different consonants, [ĝ, g, b]; that the [l] of *telling* is different from the [l$_u$] of *tell*, though the [d]'s of *add* and *adding* are the same; and that *sit* and *sing* form their past tense in different ways, since *sat* has an oral and *sang* sometimes a nasalized vowel. In short, a purely phonetic description makes it impossible to distinguish the really significant features of the vocabulary and the grammar from the accidental and personal features which inevitably form part of every utterance; as a scientific procedure it is about as fruitful as it would be for a biologist to assign two cats to different species because one had more hairs in its tail than the other. It is only by discovering the significant features of any utterance, the constants in a mass of irrelevant variables, that we can lay the foundation for linguistic study. The linguist's task (see §1.4) is to classify the facts of speech, and to reveal the system of the language by formulating general statements covering a large number of objectively different but socially equivalent events. The phonetician who refuses to subject his material to phonemic analysis not only is not a linguist, but denies the very purpose of linguistic science.

The reason for preferring a phonemic to a purely phonetic description, then, is wholly practical. By organizing the countless details of pronunciation into a small number of distinctive units, the student not only simplifies the learning process, but actually achieves a better practical command of the language than he could by any other method in the same amount of time. This statement does not rest on theory; it is borne out by the experience of all students who have used the phonemic approach in their study of a foreign language.

In all this we have said nothing about still another advantage often claimed for a phonemic description, namely that it reflects the native speaker's feeling about his language, his Sprachgefühl. The ordinary speaker of English, we are told, 'feels' that the [p'] of *pin* and the [p⁼] of *upper* are alike and both different from the [b] of *bin*; he 'feels' or 'conceives of' the two [l]'s in *little* as 'the same sound'. This may or may not be true; if true, it is an interesting fact, but it can never be used by the linguist as a criterion for his classifications, or even as a proof that he has classified correctly. The native speaker's feeling about sounds or about anything else is inaccessible to investigation by the techniques of linguistic science, and any appeal to it is a plain evasion of the linguist's proper function. The linguist is concerned solely with the facts of speech. The psychological correlates of these facts are undoubtedly important; but the linguist has no means—as a linguist—of analyzing them.

3.3. The technique of analysis. As indicated in §3.1, a PHONEME is a class of phonetically similar sounds, contrasting and mutually exclusive with all similar classes in the language. The individual sounds which compose a phoneme are its ALLOPHONES; as we have seen, there may be considerable nondistinctive differences between allophones in different positions. The process of discovering the phonemes of a language is essentially one of arranging, comparing, and combining the forms (utterances and parts of utterances) recorded in a phonetic transcription. The following steps are intended rather as a general guide to the technique than as rules to be obeyed in every particular. It is often possible to take short cuts; and experienced phonemicists do not always find it necessary to perform overtly all the operations here described. The principles of analysis, however, are the same in all cases, even when the actual operations have been so smoothed by practice and experience as to seem almost intuitive.

(1) The forms which we have recorded in a phonetic notation are first alphabetized, in any order agreed upon. This operation not only brings together all forms beginning with the same sound, but reveals at once whether the occurrence of any particular initial is limited by the following sounds. (It shows, for instance, that prevelar [ĝ] occurs in English only before front vowels, mediovelar [g] only before central and back vowels and before consonants.) Phonetically similar initials which are found never to appear before the same following sounds are grouped together, since there is no possibility of contrast between them. (Thus there can never be a pair of significantly different English forms distinguished only by the difference between [ĝ] and [g].)

Initial clusters—sequences of vowels or of consonants—are treated in one of two ways. If different clusters contain a common member, or if all the com-

ponents of a cluster occur alone as initials, it is best to regard the cluster as a sequence of independent units; but if these conditions are not fulfilled, the cluster may be regarded as a unit in itself. Clusters composed of independent units are illustrated by the English initials [Ej-, aj-; sp-, st-; pl-, kl-]. On the other hand, an initial such as English [p'] might be divided into a stop plus the following aspiration; but since [p] never occurs initially before a vowel without the aspiration, this sequence is better treated as a single unit.

The final product of this operation is a list of initial phonemes, with each phoneme described in terms of its allophones.

(2) We repeat the operation for all the other positions, listing in turn the vowels and diphthongs in various types of syllables and with various grades of stress or tone, and the consonants, both singly and in clusters, before, between, and after vowels in various parts of the utterance. For each position we get a list of contrasting phonemes, and for each phoneme a list of the allophones that occur in that position.

(3) Comparing and combining the lists we have made, we now construct a master list of all phonemes. In many languages the total number of phonemes is larger than the number found in any one position; but the master list is never simply the sum of all the subordinate lists. In compiling it, we must pay special attention to the principle of COMPLEMENTARY DISTRIBUTION; this requires that phonetically similar sounds which never contrast with each other be classed together as allophones of the same phoneme. For a discussion of the principle see §3.4.

At this point we have made an inventory of the SEGMENTAL PHONEMES, so called because they are composed of sounds which follow one another in sequence in the stream of speech and may therefore be regarded as segments of utterances. This inventory completes the first stage of our analysis, but the work is not yet finished.

(4) We now turn our attention to those modifications of the segmental sounds to which we have given the names of QUANTITY, ACCENT, and JUNCTURE (see §2.14). If these play a part in characterizing distinctively different forms in a given language, they must be analyzed and classified with as much care as the segmental phonemes, and a scientific description of the language must give them equal prominence.

The methods of analysis are in principle the same for these prosodic features as for segmental phonemes. Here again we list contrasting features in as many positions as we find it necessary to distinguish; we describe each accentual or junctural phoneme in terms of its allophones; and we class together similar features in complementary distribution. The product of the analysis will be an inventory of what may be called the PROSODIC or SUPRASEGMENTAL PHONEMES.

(5) In many languages the sentence is characterized by certain features of accent which do not affect the structure of individual words. Thus English words have no inherent tone: *man* means the same thing whether it is pronounced with high or low, rising or falling pitch. But an English sentence cannot be completely described without mention of its characteristic tone pattern

(cf. §2.14). Features of accent pertaining to the sentence rather than to individual words are called INTONATION. They are analyzed and classified like other features of pronunciation, except that in arranging and comparing forms we must use whole sentences in place of isolated words.

Phoneticians and grammarians have often in the past neglected intonation; but no phonemic description is complete unless it accounts for every aspect of pronunciation. For English, the intonation is sufficiently described if we state the relative stress of words in various constructions and the various contours of pitch at the ends of different types of clauses and sentences. For other languages it may be necessary to include less or more; as always, the features to be included are determined by the distinctive contrasts which serve in a given language to differentiate meanings.

(6) So far we have been concerned only with making inventories of the distinctive units of the language; but a mere list of phonemes tells us nothing about the manner in which they are used. To discover this, we must group the phonemes in structural sets on the basis of their function. The process will be described in §3.5.

3.4. Complementary distribution. The principle of complementary distribution, mentioned in the preceding section, may be defined as follows. If two or more sounds are so distributed among the forms of a language that none of them ever occurs in exactly the same position as any of the others, and if all the sounds in question are phonetically similar in the sense of sharing a feature of articulation absent from all other sounds, then they are to be classified together as allophones of the same phoneme. Sameness of position means not only sameness of location with respect to the beginning and end of forms (initial, medial, final), but also sameness of environment as determined by preceding and following sounds, by juncture conditions, and by accent.

To the implied rule that phonetically different allophones of the same phoneme never occur in the same position, there is one exception. There may be, in some particular positions, FREE VARIATION between two or more allophones; that is, successive forms of the same word may show sometimes one of the allophones, sometimes another, without difference in meaning. Thus final voiceless stops in English are sometimes aspirated, sometimes unaspirated, sometimes unreleased; but the three varieties never serve to differentiate meanings, and any form that ends in one of these varieties will be matched in the utterances of the same speaker by equivalent forms ending in the other two. Similarly, the vowel of words like *law, caught, ball* may vary in the pronunciation of a single speaker or a single community from a low back [ɒ] to a lower-mid back [ɔ].

To illustrate the principle of complementary distribution, we shall list here some of the sounds found to occur in utterances of one American English dialect (roughly the dialect spoken in the north central states), and indicate for each sound the positions in which it occurs.

Aspirated [t'] initially before a vowel (*tin, tomorrow*); medially between vowels, if the following vowel has the louder stress (*attack*); medially after any consonant except [s], before a stressed vowel (*captivity, dictation, entire, particular,* etc.);

finally after a vowel or any consonant, but here in free variation with [t⁼] and [t'] (*at, apt, act, cast, raft, wished, melt, ant*, etc.).

Unaspirated [t⁻] initially before [š] and voiceless [ɹ] (*chew, true*); after initial [s], before a vowel (*stone*); after initial [s], before voiceless [ɹ] (*strong*); medially after any voiceless consonant, before a weak-stressed vowel (*captive, active, casting, after, Ashton*); medially after [s], before a strong-stressed vowel (*astonish*); medially after any consonant, before voiceless [ɹ] (*gastric, destroy, actress, paltry, poltroon, entry, intrigue, portray*, etc.); medially after [ɹ, l, n], before [š] (*parching, filching, punching*); after a vowel, before final [s] and [š] and [št] (*cats, catch, matched*); after any consonant, before final [s] (*acts, casts, rafts, melts, ants*, etc.); after [ɹ, l, n], before final [š] and [št] (*parch, filch, punch, parched, filched, punched*); finally after a vowel or any consonant, but here in free variation with [t'] and [t'] (*at, apt*, etc., as above).

Unreleased [t'] medially before another stop and before [m] (*hatpin, Atkins, shotgun, apartment*); finally after a vowel or any consonant, but here in free variation with [t'] and [t⁼] (*at, apt*, etc., as above).

Labialized unaspirated [t_w] initially before voiced or voiceless [w] (*twice*); medially after a vowel, before voiced or voiceless [w] (*between*); medially after [n], before voiced or voiceless [w] (*Antwerp, untwine*).

Weakly palatalized unaspirated [t_i] initially before voiced or voiceless [j] (*tune*); medially after a vowel, before voiced or voiceless [j] (*mature*); medially after [ɹ, n], before voiced or voiceless [j] (*parturient, parturition, contusion, contumely*); medially after [s], before voiced or voiceless [j] (*postulate*). But many speakers of this dialect never pronounce [j] after [t], and hence have no palatalized stop in words of the type here cited.

Nasally released [t^n] medially after a vowel, before [n] and syllabic [n̩] (*Aetna, button*); medially after [ɹ, l, n], before [n] and syllabic [n̩] (*partner, carton, Fulton, mountain*).

Laterally released [t^l] medially after a vowel, before [l] (*atlas*); medially after [ɹ, l, n], before [l] (*artless, faultless, gently*).

Voiced [t_v] (differing from English [d] in being shorter and articulated with greater muscular tension, i.e. fortis instead of lenis) medially between vowels, if the following vowel is weak-stressed (*Betty, matter, barometer*); medially after [ɹ, l, n], before a weak-stressed vowel (*artist, alter, center*); medially after a vowel and after [ɹ], before syllabic [l̩] (*bottle, Aristotle, mortal*).

An examination of the preceding eight paragraphs will show that they include all positions in which it is possible for any variety of [t] to appear in isolated words in standard English; and further, that with one exception, no position is occupied by more than a single variety of [t]. The exception is final position, where the three varieties [t', t⁼, t'] appear in free variation with each other; but as we have already noted, the difference here is nondistinctive. Finding, then, that the eight varieties of [t] listed above are all in complementary distribution, and that they share a feature of articulation (defined by the term 'fortis apical stop') absent from all other sounds of the language, we class them together as allophones of a single phoneme. In one detail, however, our procedure in

If we make a similar inventory of sounds and positions for varieties of [d], the lenis apical stop, we discover that in certain positions [t] and [d] are in direct contrast (e.g. *tin, din; butting, budding; bite, bide*) and in other positions are members of contrasting clusters (e.g. *chain, Jane; true, drew; carts, cards*), but that in one set of positions, namely after [s], only one of them occurs. (The student should confirm these statements for himself by transcribing the following words phonetically and grouping them according to the variety of [d] which they contain: *abdomen, add, addle, adjust, admire, ardent, barges, bedraggle, bends, bilge, bulging, caldron, Cedric, coldly, delay, dew, din, draw, dwarf, ebbed, Edgar, Edna, Edwin, elder, fardel, foundry, friendly, fudge, golden, hand, handbag, handle, hardly, held, hidden, hinge, hoarding, holds, induce, join, ladder, large, loads, London, loved, Magda, Mazda, nagged, oddly, ordure, pardon, pungent, raised, ready, redeem, reduce, ridges, Saturday, under, undress.*)

The cluster [st̄] in *stool* contrasts with [sp̄] in *spool* and with [sk̄] in *school*; but there is no further initial cluster [sd]. Moreover, the degree of muscular tension, never an easy feature to estimate precisely, is especially uncertain in the stop after [s]; we have assumed it to be fortis, but in the pronunciation of many speakers it may be lenis. In view of this lack of contrast between [t] and [d] after [s], and of the difficulty of deciding whether the stop in this position is unambiguously fortis or lenis, it may seem arbitrary to assign the stop to either of the two possible phonemes. Some phonemicists refuse to make a choice, and instead set up an independent phoneme for any sound that is in complementary distribution with two or more other sounds and phonetically similar to both or all of them.

Such caution is wise when the object of the classification is to exhibit in detail not only the possibilities of contrast between phonemes but also the positions where particular contrasts are suspended. Our object is not this; it is, instead, the practical but no less scientific one of ordering the sounds of a language into a minimum set of contrasting units, in terms of which the pronunciation, the vocabulary, and the grammar of the language can be most efficiently described. Instead of creating a special class to accommodate the ambiguous apical stop after [s], we assign it—arbitrarily perhaps—to the same phoneme as the stop in *tin*, simply because we find it an advantage to keep the number of separate phonemes as small as possible. If it were for any reason more convenient, we could just as well class this stop with the [d] in *din*; our choice has been directed by tradition as much as by anything else. Whichever choice we make, the suspension of contrast between [t] and [d] after [s] will appear from our description as clearly as if we had followed the more cautious procedure mentioned above.

We append a few other examples of complementary distribution. The [l̥] between [p] or [k] and a strong-stressed vowel, as in *play, clay*, is usually voiceless; [l] in all other positions is voiced. Since the difference in voicing is always accompanied by a difference in the phonetic environment, we class both varieties together in one phoneme.—In words like *milk, vulgar*, many speakers pronounce a dorsal [ʟ] instead of an apical [l]. Since [l], in this dialect, never occurs before [k, g], and [ʟ] occurs nowhere else, the two varieties must again be classed

together. The characterizing phonetic feature of this phoneme is lateral opening, present in both [l] and [ʟ] but absent from all other English sounds.—The prevocalic semivowel [j], as in *yes, you,* is produced by moving the tongue from a relatively higher and more advanced position into the position required for the following vowel; the postvocalic semivowel [j] in *day, high, boy* is produced by a contrary movement (see §2.9). The two varieties are in complementary distribution, and share a peculiarity of tongue position relative to that of a contiguous vowel; both are members of the same phoneme.—The two vowels in *above* [ə'bʌv] never occur under similar accentual conditions: [ə] is always weak-stressed, [ʌ] always more strongly stressed. Though there is a clear difference between these vowels in quality, they share the feature of being non-front unrounded mid vowels, and are accordingly to be classed together.

3.5. Phonemic structure. The segmental phonemes of a language can be grouped according to the phonetic description of their allophones: thus we can group the English consonant phonemes into voiced and voiceless, or into stops, spirants, nasals, and lateral, or into bilabial, labiodental, alveolar, and so on. But there is another method of grouping which proceeds on an altogether different principle and which is far more valuable in exhibiting the use to which the several phonemes are put in the internal economy of the language. This is a grouping of phonemes into structural sets on the basis of their occurrence in particular positions or combinations. A STRUCTURAL SET is a group of all the phonemes which occur in a given phonetic environment and hence, in that position, directly contrast with each other. Any environment can be used to determine a structural set: initial, medial, or final position; occurrence between vowels or between consonants or between vowel and consonant; participation in various kinds of clusters; particular accentual and juncture conditions; and so on. An exhaustive catalog of such sets, each defined by the common function of its members, amounts to a description of the PHONEMIC STRUCTURE of the language.

In English, for example, a number of structural sets are determined by the occurrence of consonants in various kinds of initial clusters. Six consonants occur initially before voiced or voiceless [l], as in *play, clay, blame, glade, flame, slay*; nine, including five of the preceding set, occur before voiced or voiceless [ɹ], as in *pry, try, cry, bribe, dry, grime, fry, thrive, shrine*; seven, of which three appear also in the first set and five in the second, occur before voiced or voiceless [w], as in *twin, quit, dwarf, Gwen, thwart, swing, white*; and eight, or in some dialects thirteen—the latter number including all but one of the consonants already noted—occur before voiced or voiceless [j], as in *pure, cure, beauty, gules, few, view, muse, hue* (*tune, dew, thews, suit, new*). Another set is composed of consonants that occur after initial [s], as in *spill, still, skill, sphere, sthenic, smile, snow*; and still another by the single consonant [s], which is the only one that occurs initially before these consonants.

It is evident from these examples that the structural sets in any given language overlap extensively. Every phoneme is a member of as many sets as it has definable positions of occurrence; and its fellow-members may vary from set to

set. Thus, the *k* phoneme is a member of five out of the six sets described in the preceding paragraph; but the *p* phoneme, which appears as a fellow-member of *k* in most of these five sets, is lacking in the set of consonants before [w], and the *š* phoneme appears in only one of them.

Occasionally a structural set turns out to be almost or completely identical with a grouping based on phonetic criteria. Thus the set composed of English initial consonants preceding [l] and [ɹ] includes all the stops and all the voiceless spirants except [h]; and if we examine the composition of English final clusters ending in [s] or [z] (for instance in plural nouns like *cups, lamps, cats, rafts, roofs, cubs, hands, leaves, rims,* etc.), we find that all the consonants preceding [s] are voiceless and all those preceding [z] are voiced. But in other cases there is no such correlation between structure and phonetics. Thus the set of English consonants limited to medial and final position has two members (the final consonants in *rouge* and *sing*), of which one is a voiced spirant, the other a nasal.

3.6. Phonemic symbols. The essence of a PHONETIC symbol is that it should have a fixed value, defined in strictly phonetic (that is, physiological) terms. As we observed in §2.7, any symbol is intrinsically as good as any other; but once we have agreed upon a particular symbol to represent a given category of sounds, we shall be wise to use it consistently in that value. Since in a purely phonetic transcription we try to record our impression of an utterance as minutely as we can (§2.15), a phonetic alphabet must provide enough letters and diacritics to match the acuteness of our hearing. As a result, such a transcription inevitably bristles with 'queer symbols' and intricate combinations; its general appearance is likely to be forbidding.

In a PHONEMIC TRANSCRIPTION, on the other hand, the phonetic differences between allophones of the same phoneme are disregarded; the proper allophone is always either implied by the environment or else a free variant (see §3.4)—in either case, nondistinctive. All we need here is one symbol for each phoneme of the language to be transcribed. Since every language has a phonemic system all its own, without regard for distinctions that may be important in other languages, the phonemic value of a symbol can be defined for only one language at a time; and the same symbol can be used without inconvenience or ambiguity to represent widely dissimilar phonemes in two or more languages.

A phonemic transcription is not only a graphic representation of linguistic structure; it is also a PRACTICAL ORTHOGRAPHY, using the smallest possible number of letters to represent everything in a language that plays a part in the differentiation of meanings. For this reason it is advantageous to use letters that are easy to write, to print, and to read; the phonetic values which may have been assigned to them are completely irrelevant to their use in a phonemic transcription. Thus, if a language has only five vowel phonemes, the best way of representing them phonemically—regardless of their phonetic nature—is by the letters *a, e, i, o, u.* If a language has [ɹ] but no trills, the [ɹ] is most conveniently represented by an ordinary *r.* Or if aspiration is nondistinctive—either because all the stops are aspirated or because there is no contrast between allophones with and without this feature—then there is no need for indicating

its presence; a plain *p* is enough to represent [pʻ], or both [pʻ] and [pˉ]. In short, the simpler and more common the symbol is, the better it serves in a phonemic transcription.

In order to distinguish phonemic symbols from phonetic, we enclose the former between diagonals: [p] = a voiceless unaspirated bilabial stop; /p/ = any phoneme in a particular language that we have agreed to write in this way.

3.7. The phonemes of English. This section illustrates the principles of phonemic analysis by classifying the sounds of English into phonèmes. Only the finished classification is presented, usually without reference to the phonetic material on which it is based. The student should test his understanding of the technique by reconstructing the evidence for each part of our classification. The dialect of English here described is a generalized version of the type spoken by educated persons in the central Atlantic states, from Maryland through eastern Pennsylvania to New Jersey. Minor differences within the dialect will be generally disregarded; but for other dialects the analysis must be modified at various points to fit the particular requirements of each area.

(1) JUNCTURE. If we compare sounds occurring at the beginning, in the interior, and at the end of utterances, we observe that some phonemes have strikingly different allophones in these three positions. After a pause, a loud stress on the first syllable sets in simultaneously with the beginning of the first segmental sound and rises rapidly in strength; initial vowels may begin smoothly (with the glottis already in the position for voice) or with a nondistinctive glottal stop; voiceless stops are aspirated even before a weak-stressed vowel; and all consonants are normally short, though easily lengthened for emphasis. Before a pause, a loud stress on the last syllable falls off slowly, and is accompanied by 'drawling' of the segmental sounds; a weak stress is usually still weaker than in other positions, and may decrease in loudness toward the end of the syllable; final vowels and diphthongs, as well as final nasals and laterals, are exceptionally long or drawled; stops are often unreleased; voiced stops and spirants are unvoiced at the end. All these phenomena and some others, associated with postpausal and prepausal allophones, we summarize as features of OPEN JUNCTURE. The transition from a pause to the first segmental phoneme of an utterance, or from the last segmental phoneme to a following pause, we define as EXTERNAL OPEN JUNCTURE; a transition from one sound to another not marked by any of the features we have mentioned is CLOSE JUNCTURE.

Further observation shows that the features of open juncture are present not only before and after pause, but also internally in some utterances (cf. §2.14). INTERNAL OPEN JUNCTURE contrasts with close juncture in such words as *tin-tax* 'a tax on tin' and *syntax; slyness* and *minus; an aim* and *a name; night-rate* or *dye-trade* and *nitrate*. In a phonemic transcription, external open juncture is marked by leaving a space between symbols, internal open juncture by a hyphen; close juncture is indicated by writing the symbols close together.

(2) STRESS. A comparison of significantly different forms with the same or similar segmental phonemes but with different grades or distributions of loudness

shows that English stress can be completely described in terms of four contrasting grades. These may be numbered from 1 (loudest) to 4 (weakest), or called by descriptive names such as LOUD, REDUCED LOUD, MEDIAL, and WEAK; it is useful to group the first three together as STRONG. In a phonemic transcription, the strong stresses are best indicated by accent marks over the vowel letters, as /á, â, à/, the weak stress by the absence of a mark, as /a/.

The following words and phrases, cited in conventional spelling but with junctures and stresses marked, illustrate the four grades and suggest the process of comparison by which we arrive at this number:

cát, ánd, yés	*cóntènts, rótàte*	*bláck-bîrd, réd-câp*
béllow, cúrrent	*ùntíe, ròmánce*	*ôld-mán, rêd-bárn*
belów, corréct	*réctifỳ, démocràt*	*téll(h)im-sô, stóp-thât*
énemy, pólitics	*rèferée, dèmocrátic*	*câtan(d)-dóg, sêe(h)im-rún*
anémic, polítely	*ásk-fòrit, nòt-atáll*	*móvie-àuditôrium, élevàtor-ôperàtor*

Like other phonemes, each of the four stress phonemes has a number of non-distinctively different allophones; it is not the absolute loudness of a syllable that is important, but the loudness relative to other syllables in the same utterance. Even in a single utterance, two or more syllables with the same stress phoneme may have perceptibly different degrees of loudness, depending on their position in the utterance and on their distance from points of open juncture and from syllables with distinctively louder stress. In the sentence *A lánguage is a sýstem of ârbitràry vôcal sýmbols*, there are three loud stresses, two reduced loud, one medial, and ten weak; but a mechanical device for measuring loudness (intensity) would probably show a dozen or more different grades instead of only four. As always, the phonemes we set up are classes of objectively different sounds, constructed for the special purpose of describing the linguistic structure; stress phonemes are classes of intensity-features.

(3) CONSONANTS. All standard dialects of English agree in distinguishing the same number of consonant phonemes, though not all show them in exactly the same positions and combinations. The following list is an inventory of these phonemes, each exemplified in a few typical words.

/p/ *pin, upper, lip*	/ð/ *then, other, bathe*
/t/ *tin, better, bit*	/z/ *zink, fuzzy, his*
/k/ *kin, lucky, back*	/ž/ *azure, rouge*
/b/ *bin, rubber, cub*	/m/ *mat, simmer, dim*
/d/ *din, rudder, sad*	/n/ *gnat, sinner, din*
/g/ *give, beggar, fig*	/ŋ/ *singer, thing*
/f/ *fin, coffer, cough*	/l/ *lip, follow, call*
/θ/ *thin, Matthew, bath*	/r/ *rip, arrow, car*
/s/ *sin, jussy, miss*	/j/ *yet, high* (§§2.9, 3.4)
/š/ *shin, fashion, rash*	/w/ *wet, how* (§§2.9, 3.4)
/v/ *vine, cover, give*	/h/ *hat, behave*

Consonant clusters are for the most part transparent. To illustrate the occurring types, we give a complete list of initial clusters, except for combinations of apical consonant + /j/ (which are rare in some varieties of the dialect here

described) and a few clusters heard only in foreign names. Medial and final clusters are more numerous, but present no special problem.

/pl/ *play*	/fr/ *fry*	/kw/ *quit*	/sθ/ *sthenic*
/kl/ *clay*	/θr/ *thrive*	/dw/ *dwarf*	/sm/ *smile*
/bl/ *blame*	/šr/ *shrine*	/gw/ *Gwen*	/sn/ *snow*
/gl/ *glade*	/pj/ *pure*	/θw/ *thwart*	/spl/ *splash*
/fl/ *flame*	/kj/ *cure*	/sw/ *sweet*	/skl/ *sclerotic*
/sl/ *slay*	/bj/ *beauty*	/hw/ *white*	/spr/ *spring*
/pr/ *pry*	/gj/ *gules*	/tš/ *chain*	/str/ *string*
/tr/ *try*	/fj/ *few*	/dž/ *Jane*	/skr/ *scream*
/kr/ *cry*	/vj/ *view*	/sp/ *spill*	/spj/ *spew*
/br/ *bribe*	/mj/ *muse*	/st/ *still*	/skj/ *skew*
/dr/ *dry*	/hj/ *hue*	/sk/ *skill*	/smj/ *smew*
/gr/ *grime*	/tw/ *twin*	/sf/ *sphere*	/skw/ *squeal*

Only four of these clusters require comment. /hj/ and /hw/ occur in those dialects which distinguish *hue, Hughes* from *you, use* and *whale, whine* from *wail, wine.* The initial sound in *hue* and *whale* is most commonly a voiceless semivowel, becoming voiced just before the beginning of the vowel; but it is more convenient to analyze these sounds as clusters of /h/ + /j, w/ than to posit two additional phonemes. It should not surprise us to find that the allophones of /h/ include voiceless [j] and [w]. If we observe carefully the initial sounds of *he, ham, hoe, who,* we note that in each word the allophone of /h/ is pronounced with the tongue and the lips exactly or approximately in the position required for the following vowel; cf. §2.10 (4). We summarize these facts by saying that before any voiced sound x, the allophone of /h/ is the voiceless counterpart of x; and we describe the feature of articulation which characterizes /h/ as partial or complete voiceless anticipation of a following voiced sound.

The affricates in *chain* and *Jane* are treated by many phonemicists as unit phonemes, often written /č, ǰ/. There are some advantages in this treatment; but the following considerations persuade us to regard them rather as clusters. If these sounds are unit phonemes, then they are the only phonetically correlated pair of voiceless and voiced phonemes (like /p, b; t, d; f, v/, etc.) of which neither member participates in any initial clusters; that is, there is no such combination as /sč-, čl-/ or the like in any standard dialect of English. Medially and finally, the sounds in question behave exactly like such unmistakable clusters as /ts, dz/ and /tr, dr/; compare *Patsy* and *hatchet, Betsy* and *wretched, buttress* and *duchess, sudsy* and *pudgy, sundry* and *spongy, cats* and *catch, parts* and *parch, rids* and *ridge, builds* and *bilge.* Moreover, speakers who pronounce words like *fence, rents, hens, bends* indifferently with [-nts, -ndz] or with [-ns, -nz] (and they are many) similarly pronounce words like *bench, hinge* indifferently with [-ntš, -ndž] or with [-nš, -nž]. By analyzing these affricates as /tš, dž/ rather than as unit phonemes, we simplify the description of the total structure, which must account for distributions as well as for individual phonemes. (Contrasts like *white shoes* vs. *why choose,* which are sometimes used as evidence for a unit phoneme /č/, are better explained by a difference in juncture.)

(4) VOWELS. Vowels and diphthongs constitute the syllabic phonemes, so called because they act as peaks of the syllables in which they occur (cf. §2.9). English syllabics can be completely and accurately described in terms of six vowel phonemes, which occur as peaks of syllables either alone or in combination with a following semivowel. In the distribution of these vowels and diphthongs, English dialects differ more than in any other feature. For the dialect here analyzed the facts are classified as follows.

Simple vowels with strong stress occur only in checked syllables (i.e. in syllables ending in a consonant): with loud stress in *pít* /i/, *pét* /e/, *pát* /a/, *pót* /o/, *cút* /ə/, *pút* /u/; with reduced loud in (*háir*)-*pîn*, (*púp*)-*tênts*, (*dóor*)-*mât*, (*ármy*)-*côt*, (*téar*)-*dûct*, (*hánd*)-*bôok;* with medial in (*cón*)*vìct*, (*cón*)*tènts*, (*áuto*)*màt*, (*ápri*)*còt*, (*cón*)*dùct*, (*spóon*)*fùl*.

Simple vowels with weak stress follow rules of their own. /i/ and /ə/ occur both in checked syllables and in free syllables (i.e. in syllables not ending in a consonant), e.g. in *hábit*, *hélping*, *hábitàt* and in *cáutious*, *condémn*, *sófa;* /u/ also occurs in both kinds of syllables, e.g. in *cáreful*, *éducàte*, but is commonly replaced by /ə/. Many speakers pronounce the weak-stressed vowel of *hánded* and *róses* either as /i/ (the vowel in *cándid*) or as /ə/ (the vowel in *Rósa's*); but some speakers pronounce *hánded* and *róses* with a weak-stressed vowel different from both of these, phonemically /e/. Weak-stressed /a/ and /o/ occur only in some varieties of our dialect, and only in checked syllables immediately preceding a syllable with loud stress, e.g. in *palpátion*, *àdvantágeous* and in *Octóber*, *postérior*.

The syllabic consonants [l̩, m̩, n̩], as in *gámboling*, *fáthoming*, and *évening* 'smoothing' (contrast the nonsyllabic consonants in *gámbling*, *rhýthmic*, and *évening* 'dusk'), are conveniently analyzed as /ə/ + ordinary /l, m, n/; the weak-stressed retroflex vowel in *fáther*, *pertáin* is analogously analyzed as /ər/.

Diphthongs occur both in checked and in free syllables: /ej/ loud-stressed in *báy*, *báit*, weak in the first syllable of *vacátion*; /aj/ loud-stressed in *búy*, *bíte*, weak in phrases like *I knów*, *my són;* /oj/ loud-stressed in *bóy*, *bóil;* /aw/ loud-stressed in *ców*, *bóut;* /ow/ loud-stressed in *gó*, *bóat*, weak in *window*. To these must be added, in the dialect here described and in most other varieties of standard English, /ij/ loud-stressed in *sée*, *béat*, weak in *cárry*, *cándied* (cf. *cándid*); and /uw/ loud-stressed in *tóo*, *bóot*, weak in *válue*.

Long vowels occur both in checked and in free syllables: /a·/ in *cálm*, *fáther;* /o·/ in *cáught*, *láw*. In dialects where the syllabics of *see* and *too* are nondiphthongal vowels, these are /i·, u·/. The monosyllabic combination [ɛə] or [æ^ə] in *yeah* can be analyzed as /e·/, since there is no other /e·/ contrasting with it. This syllabic occurs also in some varieties of our dialect in words like *bad*, *adds*, *jazz*, (*tin*) *can*, when these differ from *bade*, *adz*, *has*, (*he*) *can* in having a longer and higher vowel, with or without a following glide toward mid-central position. The most efficient analysis is to regard the element which we have written here with a raised dot as a separate phonemic unit, which calls for a special allophone of the preceding vowel phoneme—longer and qualitatively different from the allophones in other positions; after certain vowels, the element /·/ appears as a nonsyllabic [ə].

This unit is in complementary distribution with [h]: the latter occurs only initially and medially after a weak-stressed vowel or certain consonants, the other never in these positions. Phonetically, the element /·/ is a voiced continuation of the preceding vowel, with the same or a progressively centralized tongue position; it is thus, except in the matter of voicing, the converse of /h/, described above as partial or complete voiceless anticipation of a following voiced sound. On the basis of distribution and phonetic similarity, we may simplify our transcription by classing [h] and the 'lengthening element' together in one phoneme, written /h/; and we may accordingly write the combinations discussed in the preceding paragraph as /ih, eh, ah, oh, uh/. Since /h/ here acts like /j/ and /w/ in forming compound syllabics with a preceding vowel, we group /h, j, w/ together in a structural set (§3.5) and label them semivowels, even though the phonetic definition of this term (§2.9) does not apply to [h].

Before /r/, the simple vowels occur with strong stress only if a weak-stressed vowel immediately follows the consonant, as in *mirror, merry, marry, sorry, hurry, jury.* Before final /r/ we find six contrasting syllabics, as in *beer, bear, bar, bore, burr, boor,* which appear also in such words as *dearer, Mary, starry, story, furry, Jewry.* None of the words in this last series rimes with any of the words in the series *mirror–jury.* Noting the resemblance of some of the syllabics in the series *beer–boor* and *dearer–Jewry* to those analyzed above as consisting of vowel + /h/, we write the series *beer–boor* as /bíhr, béhr, báhr, bóhr, bə́hr, búhr/.

In regarding the syllabics of *pat, bite, cow, calm* (or of *pot, boil, boat, law,* or of *cut, burr*) as phonemically related, we do not of course mean to imply that they all contain phonetically identical vowels. The analysis we have made means only that we have classed together, for the purpose of simplifying and systematizing our description of the language, certain objectively different categories of sounds; it neither denies the difference between them nor considers it unimportant. Phonetic diversity among allophones of the same phoneme is after all not uncommon; we ask only that such allophones be complementarily distributed, and characterized by a phonetic feature or combination of features absent from the members of all other phonemes. For each of our six vowel phonemes, we establish as the characterizing feature a certain range of tongue positions, according to the following descriptions: /i/ high non-back; /u/ high non-front; /e/ mid front; /a/ low non-back; /o/ non-high back; /ə/ mid central, or perhaps rather all remaining vowel qualities, including the syllabicity of syllabic consonants. Note that our descriptions leave the exact tongue position, as well as the position of the lips, unspecified; these vary from one allophone to another, but always within the limits of the range we have defined.

The following tabulation summarizes our analysis, and shows the distribution of allophones in each of the six phonemes. This tabulation is intended to apply only to the dialect here described; other varieties of English will require different though fundamentally similar arrangements. Even for this dialect, we do not claim that our present formulation is the final word. (In the table, V = any one of the six vowel phonemes.)

	/V/	/Vj/	/Vw/	/Vh/	/Vr/	/Vhr/
/i/	*pit*	*beat*	—	—	*mirror*	*beer*
/e/	*pet*	*bait*	—	*yeah*	*merry*	*bear*
/a/	*pat*	*bite*	*bout*	*calm*	*marry*	*bar*
/o/	*pot*	*boil*	*boat*	*law*	*sorry*	*bore*
/ə/	*cut*	—	—	—	*hurry*	*burr*
/u/	*put*	—	*boot*	—	*jury*	*boor*

(5) INTONATION. The accentual features of the sentence in American English are as yet practically unknown; only the chief types of intonation can be indicated here. There seem to be four main utterance-final intonations: STATEMENT /./, YES-OR-NO QUESTION /?/, SPECIFIC INTERROGATION (question containing a special interrogative word) /↓/, and EXCLAMATION /!/; e.g. *John is going away* /./, *John is going away* /?/ or *Is John going away* /?/, *Where is John going* /↓/ or *Who is going away* /↓/, *John going away* /!/. Non-final intonations are CONTINUING /,/ and SUSPENSIVE /../; e.g. *Unless I can stop him* /,/ *John is going away*, and *Well* /../ *perhaps.*

CONTRASTIVE intonation /ı/, involving both a distortion of the normal sentence tone and an extra-loud stress, may fall on any word or syllable in the sentence, even on a syllable normally pronounced with weak stress; e.g. (*Is Bill going away?*) *No* /,/ *John* /ı/ *is going away,* (*John is not going away, is he?*) *Yes* /,/ *John is* /ı/ *going away, I said il*/ı/*lusion* /,/ *not al*/ı/*lusion.* Statements about other distinctive intonations, and about the relative stress of words in various constructions, must wait for further study.

CHAPTER IV. MORPHOLOGY

4.1. The nature of grammatical analysis. The procedure by which we analyze the grammar of a language is in principle the same as that used in phonemics. Here again we examine a collection of utterances, list the recurrent fractions, and establish classes by grouping together parts of different utterances which are alike in form and function. Phonemic analysis must come first (cf. §3.2); for the utterance fractions listed and compared in grammatical analysis are not sounds but meaningful forms phonemically recorded.

To offset this fundamental similarity in technique there is one important difference between the two kinds of subject-matter. A phoneme is meaningless; it would be nonsense to investigate, for example, the meaning of /s/ in *see*, *slope*, and *solitude*. But every element in the grammar of a language—a word, an ending, a sentence, or whatever it may be—has not only a FORM, expressed as a particular combination of phonemes, but a MEANING also. Some considerations of meaning must enter, it is true, even into phonemics; thus we know that [p'] and [p$^{=}$] belong to the same phoneme because [rɪp'] means the same thing as [rɪp$^{=}$], whereas [p'] and [b] belong to different phonemes because the meanings of [rɪp'] and [rɪb] are different. To decide such questions, we need to ask only whether two utterance fractions are the same in meaning or different; but in grammar it is necessary to be more exacting. The four words *prince*, *boy*, *princeling*, *boiling* all have different meanings; it is only a closer examination of the meaning of each word that prevents us from setting up the absurd proportion, *prince* : *princeling* = *boy* : *boiling*.

This need for paying attention to meanings raises a practical difficulty. As we observed in §1.2, meanings are hard to define at best: even such concrete meanings as those of *prince*, *boy*, *boil* are not easily formulated so as to include all uses of these words (cf. *a prince of a fellow*, *oh boy*, *a boiled shirt*); while the meanings of elements like *-ling* and *-ing* are still more elusive. Nevertheless, it is possible to set up serviceable working definitions of any word or other grammatical element. So long as we remember that they are only makeshifts, and that no definition applies to more than one language or dialect, we shall have no trouble in operating with meaningful forms.

We divide the grammar of a language into two main parts. MORPHOLOGY deals with the structure of words; SYNTAX deals with the combinations of words in phrases and sentences. The present chapter is devoted to the first of these divisions; syntax will be discussed in Chapter V.

(To facilitate reading, we shall cite most of the English examples in these two chapters in conventional spelling; phonemic transcription will be used only where the ordinary spelling would obscure the discussion. Our justification for this practice is that the reader already knows a good deal about English. If it were a foreign language to him, the conventional spelling would be entirely inadequate to the demands of a lucid grammatical treatment.)

4.2. Word and morpheme. As we examine the recorded utterances of an informant or a speech community, we note that the same or similar forms recur

again and again with the same or similar meanings. Thus, the utterances of an English-speaking informant will contain many instances of such forms as *yes*, *person*, *I think so*, *out of town*, each time with about the same meanings, and also many instances of such different but phonemically related forms as *play*, *plays*, *played*, *playing*, or *ride*, *rides*, *rode*, *ridden*, *riding*, or *man*, *manly*, *mannish*, or *conceive*, *perceive*, *conception*, *perception*, *perceptive*, with different but related meanings.

On the basis of such recurrence, we analyze the utterances into fractions of various lengths, each with a more or less constant meaning. Any fraction that can be spoken alone with meaning in normal speech is a FREE FORM; a fraction that never appears by itself with meaning is a BOUND FORM. All the examples in the preceding paragraph are free forms; *per-*, *con-*, *-ing*, *-ly*, *-ish*, *-ceive*, *-tion* are bound forms.

A free form which cannot be divided entirely into smaller free forms is a MINIMUM FREE FORM, or WORD. In most languages, some words can be analyzed into smaller parts, bound forms or free forms in combination with bound forms; and sometimes it is even convenient to apply the term WORD to non-minimal free forms, combinations of smaller words differing in some special features of structure, accent, or meaning from phrases. A word containing one or more bound forms is called COMPLEX; a word made up wholly of smaller words is called COMPOUND. (The following sections, §§4.3–8, will be devoted exclusively to complex words; compounds will be discussed in §4.9.)

Any form, whether free or bound, which cannot be divided into smaller meaningful parts is a MORPHEME. Thus *man*, *play*, *person* are words consisting of a single morpheme each; *manly*, *played*, *personal* are complex words, since each of them contains a bound morpheme (*-ly*, *-ed*, *-al*); *man-child*, *playmate*, *salesperson* are compound words.

The way in which morphemes are put together in a complex or a compound word is called a MORPHOLOGICAL CONSTRUCTION.

4.3. Derivation and inflection. For some languages, it is useful to divide the morphological constructions of complex words into two kinds according to the grammatical function of the resulting form: DERIVATIONAL and INFLECTIONAL. If a complex word is grammatically equivalent to a simple (one-morpheme) word—i.e. if it plays an equivalent role in the construction of phrases and in further morphological constructions—we say that the complex word is DERIVED from some underlying word or morpheme. If a complex word is not grammatically equivalent to any simple word in all the constructions where it occurs—i.e. if no simple word can function everywhere in exactly the same way—we say that the complex word is INFLECTED.

The complex words *manly*, *perceptive* are grammatically equivalent to such simple words as *good*, *bad*, *wide*, in the sense that phrases like *a manly deed*, *a perceptive child* have the same syntactic construction as *a good deed*, *a bad child*, *a wide river* (see Chapter V), and that *manlier* (based on *manly*) has the same morphological construction as a word like *wider* (based on *wide*). Similarly the complex words *manhood*, *perception* are grammatically equivalent to such simple

words as *house, book* (compare *his perception was acute* with *his house was old,* or *perceptions* with *books*). On the other hand, the complex word *playing,* in such a sentence as *He was playing the piano,* is not grammatically equivalent to any simple word: no simple word can appear in the same place in the same syntactic construction. The complex word *cats* (*cat* + *-s*) is replaceable by a simple word such as *wine* or *fun* in the phrase *fond of cats* (*fond of wine,* etc.), but in many constructions it cannot be thus replaced, e.g. *these cats* (*this wine*), *there are cats here* (*there is wine here*).

Some additional examples from Latin will help to clarify the difference between derivation and inflection. The word *vēnātor* 'hunter', composed of the bound morphemes *vēnā-* 'hunt' (seen also in *vēnārī* 'to hunt') and *-tōr-* (with shortened vowel when it appears in word-final position), is grammatically equivalent to a one-morpheme word like *vir* 'man' or *passer* 'sparrow', since in the two sentences *vēnātor ursum occīdit* 'the hunter killed the bear' and *vir ursum occīdit* 'the man killed the bear', *vēnātor* and *vir* play the same part in the construction, and since the morphological construction *vēnātōr-is* 'the hunter's, of the hunter' is exactly parallel to that of *passer-is* 'the sparrow's, of the sparrow'. We can say, therefore, that *vēnātor* is DERIVED from the underlying morpheme *vēnā-*. On the other hand, the word *passeris,* which consists of the free morpheme *passer* 'sparrow' and the bound morpheme *-is* 'genitive singular', is INFLECTED; for there is no one-morpheme word in Latin which could perform the same grammatical function as *passeris* in such a phrase as *caput passeris* 'the sparrow's head'.

It must be clearly understood, and borne in mind throughout this chapter, that the term DERIVATION is here used in a descriptive, not a historical sense. When we say, for example, that *song* is derived from *sing* (§4.7), we mean that such a statement is the most convenient way of describing the relationship of one word to the other in the present-day grammar of English. We do not mean that in the chronological development of English one of these words appeared later than the other and was originally introduced into the language as a modification of the older word. This may or may not be true; but for our purpose—which is simply to describe as efficiently as possible the structure of the language as it is now spoken—all historical considerations are irrelevant.

4.4. Paradigms. In any language where morphological constructions are of the two kinds described in the preceding section, the constituent morphemes of complex words usually fall into three rather clearly defined classes. CLASS 1: The overwhelming majority of morphemes appear in both derivational and inflectional constructions; in English they are predominantly free morphemes, in Latin predominantly bound, e.g. *man, play, cat, -ceive,* Latin *vēnā-, vir* CLASS 2: Certain morphemes accompany the morphemes of Class 1 to form derivational constructions (derivative words); they are always bound, e.g. *-ly* in *manly, -ness* in *goodness, re-* in *renew* and *receive,* Latin *-tōr-* CLASS 3: A limited number of morphemes—in English fewer than a dozen, in Latin nearly 200—accompany morphemes of Class 1 to form inflectional constructions (inflected words); these also are always bound, e.g. *-s* in *cats,* a different *-s* in *helps* (different be-

cause of the meaning: 'plural' and '3d person singular'), *-ed* in *played*, *-ing* in *playing*, Latin *-is* in *passeris*.

To describe the construction of a complex word, we must state four things: the class to which each of the constituent morphemes belongs, the order in which the morphemes are arranged, the features of juncture and accent which characterize the word, and the phonemic modifications, if any, to which the morphemes are subjected in the process of combination. It is convenient to regard the morpheme of Class 1 in each complex word as the BASE to which the other morphemes are added as AFFIXES. Since morphemes of Class 1 always outnumber those of the other two classes, this treatment results in the smallest number of different constructions.

A set of related words containing a common base and all the affixes that may be attached to it, constitutes a PARADIGM. In languages where it is useful to distinguish between derivation and inflection, we may speak of derivational paradigms (with affixes of Class 2) and inflectional paradigms (with affixes of Class 3). Thus, in English, the words *man, manly, mannish, manful, manhood, manikin, unman*—the base *man* and all its derivatives—constitute a paradigm of derivation; the words *cat, cat's, cats* (the last two identical in form but different in meaning) and the words *play, plays, played, playing* constitute paradigms of inflection. Most of us are more familiar with Latin paradigms than with English ones, having memorized such model paradigms as *amīcus, amīcī, amīcō, amīcum*, etc., and *amō, amās, amat, amāmus*, etc.

It is useful to expand the meaning of the term paradigm to include any set of words with a common base (and hence with a common element of meaning), differing from each other in any kind of modification; even a set of words with different bases but with a common element of meaning may constitute a paradigm if it parallels other paradigms in the same language.

4.5. Morphological processes. The devices by which the constituent words of a paradigm are differentiated from one another are known as MORPHOLOGICAL PROCESSES. Five kinds may be distinguished, of which the first has already been discussed in the preceding section.

(1) AFFIXATION. We have defined affixes as morphemes of Classes 2 and 3, which accompany morphemes of Class 1 in derivative and inflected words. In languages where complex words need not or cannot be divided into these two kinds, affixes may be defined as bound morphemes which combine with other more numerous morphemes (free or bound according to the habits of the language) to form closed sets of words with related meanings, such that the differences in meaning are parallel from set to set.

Affixes are of three kinds according to their position: PREFIXES, added before the base; SUFFIXES, added after the base; and INFIXES, inserted in the base. In English, prefixes like *de-, re-, un-, ex-* are used in derivation but not in inflection; suffixes are used in both constructions: *-ly, -ness, -tion* in derivation, *-s, -ed, -ing* in inflection. The same is true in Latin, but other languages have habits of their own. In Chichewa, a Bantu language of central Africa, the base /-nthu/ 'individual' has the inflections /muunthu/ 'person' and /bhaanthu/ 'persons',

and the derivatives /tšiinthu/ 'thing', /kaanthu/ 'something', /tuunthu/ 'serious trouble' In Ilocano, a Philippine language of Luzon, there are inflectional infixes: /kíta/ 'a sight' /k-in-íta/ 'thing seen' (The symbol is read 'related to' or 'compared with'. The hyphen is used in the examples in this chapter, unless explicitly defined in another sense, to mark morphological divisions.)

(2) INTERNAL CHANGE. Two or more words related in form and meaning may differ from each other in some phoneme or phonemes of the base itself; one base is then described as being derived or inflected from another in the same paradigm by internal change. In English, the words *sing* : *song* constitute a paradigm of derivation, parallel to *fly* /fláj/ : *flight* /fláj-t/; *sing* : *sang* : *sung* are members of a paradigm of inflection, parallel to *play* : *played* : *played.* These examples illustrate vocalic change.

The noun *house* /háws/ and the verb *house* /háwz/ show consonantal change; similar paradigms are *belief* : *believe*, *sheath* . *sheathe*, *advice* : *advise.* The words *breath* /bréθ/ · *breathe* /bríjð/ show internal change affecting both the syllabic and the final consonant of the base.

Internal change may affect also the accent of the base or of the whole word, with or without accompanying vocalic and consonantal change. The words *tránsfèr* (noun) : *tràns fér* (verb), *ímpòrt* : *ìmpórt* show accentual change alone; *cónflìct* /kónflìkt/ *conflíct* /kənflíkt/, *fréquent* (adjective) /fríjkwənt/ : *frequént* (verb) /fri(j)kwént/ show accentual change combined with vocalic change.

Internal change may characterize affixes as well as bases. The regular suffix added to English nouns to form the plural appears in three different shapes according to the last phoneme of the base: /-ez/ (or /-iz, -əz/ in some dialects) if the base ends in /s, z, š, ž/; /-z/ if it ends in any voiced sound except /z, ž/; and /-s/ if it ends in any voiceless sound except /s, š/. We call the three forms /-ez, -z, -s/ ALTERNANTS of the same morpheme. In verbs like *rises*, *plays*, *helps*, the suffix forming the 3d person singular present has the same three alternants; in verbs like *handed*, *played*, *helped*, the suffix forming the preterit (past tense) has the alternants /-ed, -d, -t/, again automatically determined by the final phoneme of the base.

Internal change in the base very often accompanies affixation. The verbs *flee*, *say*, *tell* form their preterits by changing the syllabic of the base and adding /-d/ (*fled*, *said*, *told*); *creep*, *keep*, *weep*, and several others change the syllabic and add /-t/ (*crept*, etc.); *leave* and *lose* change both the syllabic and the final consonant of the base before the suffix /-t/ (*left*, *lost*). Many additional examples will be found in §4.8.

The study of the alternation between phonemes in morphemes related to each other by internal change is called MORPHOPHONEMICS.

(3) REDUPLICATION. Reduplication is the repetition of all or part of the base, with or without internal change, before or after the base itself. This process is familiar to students of Greek as one of the features of the regular perfect of verbs, as in λείπω /léip-o·/ 'I leave', perfect λέλοιπα /lé-loip-a/ 'I have left'. Here the base /leip/ appears in the perfect form with internal change as /loip/, and part of the base, also with internal change, is added as a prefix. In Latin,

can-ō 'I sing' has the perfect *ce-cin-ī* 'I sang', where the base *can-* appears with internal change as *cin-*, and the partial reduplication *ca-*, with a different kind of internal change, as *ce-*; cf. also Latin *caed-ō* 'I kill' : *ce-cīd-ī* 'I killed', *tang-ō* 'I touch' : *te-tig-ī* 'I touched'. (In the last example the internal change of the base *tang-* to *tig-* includes the loss of an infix *-n-*.)

Examples of reduplication following the base are found in Taos, an Indian language of New Mexico. Here some bases reduplicate the final vowel before adding a certain noun suffix; e.g. /cì-ʔí-ne/ 'knot' (where ` = secondary normal stress, ´ = primary normal stress, c = English *ch*) has the base /cí/ 'he tied', reduplication of /i/ with a glottal stop separating the two vowels, and the suffix /-ne/.

In English, reduplication plays no part in inflection, and only a limited part in derivation; cf. nursery words like *papa*, *choochoo*, and such formations as *wigwag*, *crisscross*, *razzle-dazzle*, where reduplication is combined with internal change.

(4) SUPPLETION. Suppletion may be regarded as an extreme kind of internal change, in which the entire base—not merely a part of it—is replaced by another form. The English paradigm *go* : *goes* : *went* : *gone* : *going* is irregular in several respects; one of its irregularities is that in the preterit form the base *go* is replaced by a completely different base *went*. (An alternative and possibly more useful formulation is to regard the base of the preterit as *wen-*, to which the suffix /-t/ is added instead of the /-d/ which regularly follows a base with final voiced consonant.) Still more irregular is the paradigm *be* : *am* : *is* : *are* : *was* : *were* : *been* : *being*, where the three forms *be*, *am*, and *are* correspond to the single form *play*, and the two forms *was* and *were* correspond to the single form *played* in the regular paradigm *play* : *plays* : *played* : *playing*. Again, English monosyllabic adjectives regularly form the comparative by adding the suffix /-ər/ to the base, e.g. *tall* : *taller*; but the adjective *good* has a suppletive base *bet-* before this ending, and *bad* forms its comparative (*worse*) by suppletion alone, without the use of a suffix. Latin examples of suppletion are *fer-ō* 'I carry' : *tul-ī* 'I carried' (parallel to *am-ō* 'I love' : *amā-vī* 'I loved'), *bon-us* 'good' : *mel-ior* 'better' : *opt-imus* 'best' (parallel to *alt-us* 'tall' : *alt-ior* : *alt-issimus*).

Not every set of words with different bases but a common element of meaning is a suppletive paradigm. The verbs *laugh* and *smile* are obviously related in meaning; but this relation (pertaining, we might say, to the degree or intensity of a particular action) is not expressed by any grammatical category in English: there is, for example, no suffix that can be added to a base to modify its meaning in just this way. To regard *laugh* : *smile* as a paradigm would serve no useful purpose. We speak of a suppletive paradigm only when there are non-suppletive or 'regular' paradigms in the language parallel to it, with like relations in meaning between their constituent members.

Even when this is the case, it is not always useful to set up two or more related words as a paradigm. The relation in meaning between the adjective *lofty* and the verb *elevate* is approximately the same as that between the adjectives *deep*, *dark*, *fat* and the corresponding derived verbs *deepen*, *darken*, *fatten*; but there would be no advantage in describing *elevate* as derived by suppletion from *lofty*.

It is only when words with different bases but related meanings fill a gap in the grammatical system of the language that we combine them into a suppletive paradigm. Thus, every verb in modern colloquial English except *go* and *be* (with *am, is, are*) has a preterit form which is phonemically similar to the base of the present; and every preterit form except *went* and *was/were* corresponds to a phonemically similar present base. It is obvious that the system of English verb inflection is most simply described by pairing *went* with *go* and *was/were* with *be*. Similarly, every monosyllabic descriptive adjective in English except *good, well, bad, ill,* and a few others has a phonemically similar comparative form (in spite of the nonsensical 'rules' invented by pedants about the invariability of such adjectives as *dead, round, square*); and nearly every comparative form except *better, worse,* and a few others corresponds to a phonemically similar positive base. Again the system of inflection is most efficiently described by grouping together *good* (and *well*) with *better, bad* (and *ill*) with *worse,* and so on.

There are suppletive affixes as well as suppletive bases. The suffix /-ez, -z, -s/ forms the plural of most nouns in English; but the plural of *ox* is formed with the suffix /-ən/, and the plural of *child* with the suffix /-rən/ (accompanied by internal change of the base). The suffixes /-ən, -rən/ are suppletive to the regular suffix /-ez, -z, -s/.

(5) ZERO MODIFICATION. It is often useful to speak of zero modification (a zero affix, zero change, etc.) in describing the morphology of a language. If most paradigms of a particular category (e.g. singular : plural, or present : preterit, or noun : derived verb) agree in having the constituent words differentiated by a particular suffix or set of suffixes, but if a few paradigms in the same category lack this feature and do not otherwise differentiate their constituent words, it may simplify our description of the total structure to say that the deviant paradigms have a zero suffix—that is, a suffix consisting of nothing. For example, the overwhelming majority of English nouns form their plural by adding a suffix to the base (usually /-ez, -z, -s/ but sometimes another suffix, see above); a few form the plural by internal change alone (*man, woman, goose, mouse,* etc.); and some have the plural identical in form with the singular (*sheep, deer,* etc.). Since nouns in the last group behave syntactically just like regular singulars and plurals (cf. *The sheep is running* : *The sheep are running,* just like *The dog is running* : *The dogs are running*), we may find that the syntax of the language can be most conveniently described if we say, in our treatment of the morphology, that *sheep, deer,* and the like form their plurals by the addition of a zero suffix in suppletive relation to the regular suffix /-ez, -z, -s/. Cf. §5.7 (1).

It will be a useful exercise for the student to classify the verbs of his own dialect of English according to the morphological processes which characterize their paradigms. The following list contains 85 bases. For each base the student should construct a full set of inflected forms, transcribe all forms in a phonemic notation (Chapter III), and determine the processes—affixation, internal change, suppletion, zero modification, or a combination of these—by which the constituent members of the paradigm are differentiated. It will be convenient to set up the paradigms with the largest number of phonemically

different forms as standard (e.g. *sing* : *sings* : *sang* : *sung* : *singing*), and to measure the forms of smaller paradigms against these (e.g. in the set *play* : *plays* : *played* : *playing*, the form *played* corresponds to both *sang* and *sung*). Some paradigms will turn out to be defective in one or more members (e.g. in the set *shall* : *should*, there is no form corresponding to *singing* or *playing*). Note carefully all irregularities, and all cases where a choice is possible between equivalent forms (e.g. *throve* or *thrived*, *thriven* or *thrived*; *spelt* or *spelled*). When all paradigms have been analyzed, the student should group his paradigms into classes according to the number of phonemically different forms they contain and the morphological construction of their members.

bear	*catch*	*drive*	*hate*	*mean*	*see*	*speak*
beat	*choose*	*eat*	*have*	*meet*	*seek*	*spill*
bend	*climb*	*fall*	*hear*	*must*	*sell*	*stand*
bid	*come*	*feel*	*heave*	*need*	*shed*	*stride*
bite	*cut*	*find*	*help*	*ought*	*shoe*	*strike*
blow	*deal*	*fight*	*hit*	*pass*	*shoot*	*swell*
break	*dig*	*flee*	*hold*	*praise*	*show*	*take*
bring	*dive*	*fly*	*leave*	*preach*	*shrink*	*teach*
build	*do*	*get*	*lose*	*ride*	*sit*	*think*
burn	*draw*	*give*	*love*	*ring*	*slay*	*urge*
buy	*dream*	*go*	*make*	*run*	*sleep*	*will*
can	*drink*	*hang*	*may*	*say*	*slide*	*work*
cast						

4.6. Parts of speech. The words of a language often fall into two or more classes according to their morphological construction or their syntactic function. These classes correspond to the 'parts of speech' with which our traditional school grammars have made us familiar. In the languages commonly studied in school, the classification is based primarily on inflection; but in many languages there is no inflection, or not enough to make a useful classification possible. In such languages, words can be classified only by their function in the construction of phrases and sentences; see Chapter V.

Where there is inflection, the first step toward a valid classification is to sort out the words which never appear in inflectional paradigms (in English, such words as *but*, *what*, *from*, *five*, *gosh*); these will have to be classified by syntactic function. If there is only one category of inflection in the language—that is, if all paradigms show the same relation in meaning between their constituent members (cf. §4.11)—then the language has, up to this point in our analysis, only two parts of speech: inflected and uninflected words. If there are two categories of inflection—if paradigms show two different kinds of relation in meaning between their constituent members—then we set up an additional part of speech; and so on.

The names we give to these classes are not important. Usually we retain the traditional terms, and apply such labels as NOUN, VERB, ADJECTIVE to those classes in the foreign language that correspond most nearly in function to the nouns, verbs, and adjectives of English or some other familiar language. This

is preferable to inventing a new terminology for each new language; but we must always remember that a class which we have labeled nouns in the foreign language may be in almost every respect fundamentally different from English or Latin nouns, and may be inflected (if at all) for entirely different kinds of grammatical meaning (§4.11). The fallacy of attributing to one language the grammatical habits and categories of another, simply because we have decided to call certain words in both languages by the same name, is more likely to vitiate our description than any other common error. To appreciate this danger, we have only to recall how English grammar has been distorted—not only in schoolbooks but even in some scientific linguistic works—by being forced into the mold of Latin terminology. Many of us have seen books in which English nouns, for example, are said to have the same cases (or some of them) that are necessary in describing Latin nouns. In such descriptions, a noun like *John* is said to be sometimes nominative (*John ran away*), sometimes accusative (*I saw John*), sometimes dative (*I gave John an apple*), sometimes vocative (*John, come here*). The harm done by such grammars is perhaps not very great, since those who read them are already able to speak English; but when the same bias infects the description of a language we do not know, it not only complicates the presentation but nearly always leads to the overlooking of important grammatical features that happen to have no counterpart in the more familiar languages.

Morphological classification may be illustrated by certain parts of speech in Latin. Words inflected for number and case are called NOUNS. Of these, words which have no other inflections are called SUBSTANTIVES, while those which are inflected also for gender and for degree of comparison are called ADJECTIVES. PRONOUNS are a special subclass of substantives which are classified for person and exhibit certain other distinctive traits. Words inflected for person, number, tense, mood, and voice are called VERBS. Certain kinds of words stand midway between two classes; thus PARTICIPLES are essentially adjectives, but have some characteristics of the verb as well.

The syntactic classification of uninflected words (e.g. into adverbs, prepositions, conjunctions, and interjections in Latin) is a process of another kind altogether (see Chapter V). The two methods must be kept carefully apart, though our school grammars habitually confuse them.

4.7. Treatment of derivatives. In the grammar of a language where complex words are conveniently divided into derivative and inflected, and where compound words are formally distinct from phrases (cf. §§4.2, 3), derivation and compounding are usually treated together as two aspects of WORD FORMATION. This is an important part of morphology, though in many grammatical works it is overshadowed by the writers' preoccupation with inflectional paradigms. Both derivation and compounding should and can be treated as systematically as inflection. In the present section and in the three that follow, we can do no more than illustrate some points in the descriptive approach.

In describing the members of a derivational paradigm, we usually say that one of them is the UNDERLYING WORD from which the others are derived. Thus

in the partial paradigm *man* : *manly* : *manhood* (partial because not all the members are here listed, cf. §4.4), the last two words are derived from the underlying word *man* by means of the suffixes *-ly* and *-hood*. Sometimes, however, the situation is not so clear. In the paradigm *sing* : *song*, which is the underlying word, which the derivative? If one of the members of such a paradigm is irregular in its inflection, we find that it makes for greater simplicity in the total formulation to regard the irregular member as the underlying word. (The advantage lies in the fact that we can then describe the process of derivation without having to interrupt our account with special rules to cover irregularities.) Since the noun *song* is inflected regularly (*song* : *song's* : *songs*, like the great majority of English nouns), whereas the verb *sing* is inflected irregularly (*sing* : *sings* : *sang* : *sung* : *singing*, departing from the much more common pattern *play* : *plays* : *played* : *played* : *playing*), we find it convenient, in a descriptive account, to say that here the noun is derived from the verb. In the partial paradigm *man* (noun) : *man* (verb), where the two members are differentiated by zero modification, it is the noun which is irregular in its inflection (*man* : *man's* : *men* : *men's*), while the verb is regular (*man* : *mans* : *manned* : *manned* : *manning*), so that here we derive the verb from the noun. In some paradigms, finally, we have no morphological criterion at all for making a choice; thus the noun *hand* and the verb *hand* are both inflected regularly, and either might be described as a derivative of the other. In paradigms like these, the choice of the underlying word is determined solely by convenience: whichever formulation proves the simpler in the long run is the one to be preferred.

(We must remind the reader at this point that our use of the term DERIVATION is descriptive, not historical; cf. §4.3, end. Historians happen to know that *hand* was used as a noun for many centuries before it was first used as a verb; but this knowledge is irrelevant to our task of describing the language as it is now spoken.)

The derivatives of a language can be systematized in two ways: according to the morphological processes involved, and according to the parts of speech to which the members of the paradigm belong. We may illustrate these two approaches with some examples from English.

(1) AFFIXATION is by far the most common process in the formation of English derivatives. Moreover, many of the affixes are productive, in the sense that a speaker of English can form new derivatives which he has never heard by adding these affixes to appropriate bases. The following list is only a sample; many other affixes will occur to the reader. Note that certain affixes regularly take the loud stress, others regularly take a weak stress, and still others require the loud stress to be placed on a particular syllable of the base; there are differences also in the kind of juncture between base and affix, which must be included in a scientific description of English grammar. (Hyphens in these examples indicate open juncture. Note the considerable variation in stress pattern and in juncture from one dialect to another.)

Prefixes: *afóot, ánte-rôom, ânti-clímax, befríend, bí-plâne, conténd, debáse, dè-fróst, dìs-belíeve, êx-kíng* (or *éx-kîng*), *exténd, forgíve, ìnhúman, intênd, mìs-*

cóndùct, mís-dêed, nónsènse (or *nónsense*), *nôn-téchnical, pretênd, prê-wâr* (or *prê-wâr*), *ùn-kínd, ùn-cóver.*

Suffixes: *láudable, betráyal, histórian, drúnkard, èleméntary, kíngdom, pròfitéer, wóoden, dríver, cóuntess, ártful, béautifỳ, bóy-hood, chíldish, humánity, réstless, prínce-ling* (or *prínceling*), *mán-ly, státement, slý-ness, pómpous, hárd-ship, tíresome, gángster, stóny.*

The words *contend, extend, intend, pretend* show that not all complex words are derived from an independent underlying word. The bound morpheme *-tend* has no existence apart from the derivatives in which it appears; the independent word *tend* is a different morpheme, as we know by comparing the meanings of the two. (This is an example of the difficulty referred to in §4.1: we have no technique for analyzing practical situations, but we are nevertheless compelled, in describing the grammar of a language, to combine or separate phonemically similar forms on the basis of their meanings. In the present case, since we are unable as linguists to give an accurate and all-inclusive definition of the verb *tend*, still less a definition of the bound morpheme *-tend* in the four widely different words cited above, we operate—as usual—with rough approximations to the meaning. Those who find it more satisfactory to regard *tend* and *-tend* as synonymous will give a different but equally serviceable description of the facts.) Derivatives whose base is a bound morpheme are called PRIMARY FORMATIONS; the prefixes *con-, ex-, in-, pre-* in *contend, extend, intend, pretend* act as PRIMARY AFFIXES.

INTERNAL CHANGE also serves to characterize many paradigms of derivation in English, but the examples are less numerous, and only the accentual changes are productive. Again we cite here only a few of the possibilities. Vocalic change: *feed* : *food, sing* : *song, shoot* : *shot, bite* : *bit, fill* : *full, heal* : *hale.*—Consonantal change: *calf* : *calve, sheath* : *sheathe, advice* : *advise, rent* : *rend*; combined with vocalic change: *grass* : *graze, breath* : *breathe.*—Accentual change: *ímpòrt* : *ìmpórt, tránsfèr* : *tràns fér*; combined with vocalic change: *cóndùct* (noun) : *condúct* (verb), *fréquent* (adjective) : *frequént* (verb).

Accentual change is combined with affixation in several of the examples given above, thus in *histórian* (cf. *history*), *pròfitéer* (cf. *prófit*), *èleméntary* (cf. *élement*), *humánity* (cf. *húman*). Some of these words exhibit vocalic change also. Note further the suffix *-th*, nearly always accompanied by vocalic change, by which nouns are derived from adjectives and from verbs (*wide* : *width, long* : *length, steal* : *stealth*).

ZERO MODIFICATION is almost as common in English as affixation, and perhaps even more productive. The following phrases illustrate the process by the members of a single paradigm: *my back* : *a back vowel* : *back up* : *go back.*

(2) When we classify English derivatives according to the parts of speech involved, we must distinguish paradigms in which one member is clearly the underlying word, paradigms in which the underlying word is not morphologically marked, and paradigms consisting of primary formations. The following samples illustrate the procedure.

If the underlying word is a noun, the derivative may be another noun (*king* : *kingdom*), an adjective (*child* : *childish*), a verb (*man* : *unman, beauty* : *beautify*),

or an adverb (*head* : *headlong*, *clock* : *clockwise*). If the underlying word is an adjective, the derivative may be a noun (*red* : *redness*, *long* : *length*), another adjective (*red* : *reddish*, *good* : *goodly*), a verb (*deep* : *deepen*), or an adverb (*deep* : *deeply*). If the underlying word is a verb, the derivative may be a noun (*ride* : *rider*, *grow* : *growth*), an adjective (*drink* : *drunken*, *tire* : *tiresome*), or another verb (*gain* : *regain*, *fasten* : *unfasten*). If the underlying word is an adverb, the derivative may be an adjective (*up* : *uppish*) or another adverb (*up* : *upward*).

In the following pairs the underlying word is not formally identified: noun and noun, *youth* 'early life' : *youth* 'young man'; noun and adjective, *iron* (*is heavy*) : *iron* (*bar*); noun and verb, *food* : *feed*, *success* : *succeed*, *play* : *play*; noun and adverb, *back* : (*go*) *back*; adjective and adjective, *whole* : *hale*, *tiny* : *teeny*; adjective and verb, *hale* : *heal*, *dry* (*toast*) : *dry* (*the dishes*); adjective and adverb, *fast* (*movement*) : (*walk*) *fast*; adverb and preposition, (*come*) *in* : *in* (*the room*).

The following paradigms consist of primary formations: *perception* : *conception*; *nation* : *native*; *stupor* : *stupid*; *famine* : *famish*; *civil* : *civic*; *regular* : *regulate*; *persuade* : *dissuade*.

4.8. Treatment of affixes. In the preceding section we centered our attention on words and bases, and considered the morphological processes only as they appear in particular paradigms. These processes, however, are just as important in the grammar of a language as the bases which they serve to differentiate; moreover, since the morphological processes are always less numerous than the bases (§4.4), it is often convenient to classify bases in terms of the modifications to which they are subject. When we describe the use to which a particular process is put—for example, the bases to which a particular derivational suffix is attached—we may find that in order to give a complete and accurate account of the facts, we must examine a very large number of derivatives and formulate very precise rules of combination and modification. We shall illustrate this principle by describing some of the uses of the English suffix *-ous* /-əs/.

This suffix makes adjectives, chiefly derived from nouns (*pomp* : *pompous*). To begin with, the suffix is not added to all nouns—for instance, not to *man*, *house*, *apple*, *table*, *object*—but only to a restricted number, which belong to what may be called the foreign-learned part of the English vocabulary. In a complete grammar of the language, the nouns which may be accompanied by the suffix *-ous* would have to be listed in full.

(1) In its normal form, this suffix is added to nouns which do not end in /t, s, z, š, ž/: *cavern* : *cavernous*, so to *beauty*, *murder*, *libel*, and many others; it is added to only one noun in /d/: *hazard*. If the noun is long enough, we find that the loud stress is on the second syllable before the suffix: *rídicùle* : *ridículous*, *pársimony* : *pàrsimónious*.

(2) It is added to a very few verbs: *prosper* : *prosperous*, *continue* : *continuous*.

(3) The suffix appears in some adjectives where it is not added to any English word, as in *jealous*, *pious*, *raucous*, *viscous*, *incongruous*. These are primary formations (§4.7), and the suffix *-ous* functions here as a primary suffix. The elements to which a primary suffix is added may be called ROOTS: *jeal-*, *pi-*, *rauc-*, and so on.

(4) It is added to two verbs ending in /t/: *covet, solicit.* The meaning of *solicitous* deviates considerably from that of the underlying word; we shall not take the space here to mention all instances of this sort.

(5) In some instances the suffix is accompanied by vocalic change in the base: *vein* /ej/ : *venous* /ij/; *zeal* /ij/ : *zealous* /e/; *omen* /ow/ : *ominous* /o/.

(6) Besides the vocalic change, the following loses a sound: *number* /ə/ : *numerous* /uw/, with loss of /b/.

(7) /əl/ is replaced by /jul/ in *miracle* : *miraculous*; so also *scruple.*

(8) The same replacement is accompanied by vocalic change in *fable* /ej/ : *fabulous* /a/; *people* /ij/ : *populous* /o/.

(9) /ər/ is replaced by /r/ in *fiber* : *fibrous*; so also *leper, lustre, monster, wonder*; optionally in *thunder*, which underlies both *thunderous* and *thundrous.*

(10) The suffix is added to a noun in /t/, and /i/ is replaced by /juwi/ in *circuit* : *circuitous.*

(11) /ə/ is replaced by /ow/ in *harmony* : *harmonious*; so *melody, euphony, felony.*

(12) /ər/ is replaced by /ohr/ in *victory* : *victorious*;

(13) by /ihr/ in *mystery* : *mysterious*; and

(14) by /ur/ or /uhr/ in *injury* : *injurious*; so also *penury, usury.*

(15) The last-named change is accompanied, optionally, by consonantal change in *luxury* : *luxurious*, where the underlying word has /kš/ but the adjective sometimes /kš/ and sometimes /gž/.

(16) /f/ is replaced by /v/ in *grief* : *grievous*; so also *mischief.*

(17) Final *-y* of the underlying noun is dropped in *mutiny* : *mutinous*; so also *treachery, infamy, bigamy*, and quite a few others.

(18) Final /ən/ is dropped in *caution* : *cautious*; so also *oblivion, citron, faction amphibian.*

(19) Final /əs/ is dropped, so that noun and adjective are HOMONYMOUS (phonemically identical) in *mucus* : *mucous, callous, phosphorus.*

(20) Final /əm/ is dropped in *odium* : *odious*; so also *vacuum, decorum* (but see Number 26 below).

(21) Final /ə/ is dropped in *scrofula, nebula, nausea.*

(22) Final /ijən/ is dropped and the loud-stressed syllabic replaced by /ə/ in *barbarian* : *barbarous.*

(23) Adjectives derived from bases ending in the phonemes /t, d, s, z, š, ž/ have the loud stress on the syllable immediately preceding the suffix (PRE SUFFIXAL STRESS), but there are only a few forms for which this description will suffice; e.g. *óutràge* : *òutrágeous.*

(24) Some have vowel change in addition to accentual change: *cóurage* /i/ : *courágeous* /ej/; *móment* /ə/ : *moméntous* /e/; *sácrilege* /i/ : *sàcrilégious* /ij/

(25) This form of the suffix is used after quite a few nouns ending in /šən/ or /džən/, which drop the /ən/: *ambition* : *ambitious, religion* : *religious*; so also *flirtation, suspicion, contagion*, and others.

(26) The form with presuffixal stress is used also in a few other derivatives. Thus, with /ər/ replaced by /r/, *disaster* : *disastrous*; with loss of final *-y, polyandry* : *polyandrous*; with loss of final /əm/, *decórum* : *decórous*, beside the form

We can merely mention some of the extended forms of our suffix, in which *-ous* is preceded by other sounds: /ijəs/ in *uproarious*, /uwəs/ or /juwəs/ in *sensuous*, /šəs/ in *bumptious*, /ohrijəs/ in *meritorious*, etc.

This outline, long as it is, is incomplete. A careless description, such as is all too common in our textbooks and handbooks, would say merely that adjectives are made with *-ous*, *-ious*, *-eous*, and similar endings. Even our hasty survey shows how very inadequate such a statement would be.

4.9. Compound words. According to the definition in §4.2, a COMPOUND is a word composed entirely of smaller words. The difference between a compound and a phrase (a syntactic construction involving two or more free forms) must be determined separately for each language; if no formal characteristics can be discovered for distinguishing between them, then the language has no compounds.

In English, compounds differ from phrases in the phonemic modification of their components, in the kind of juncture between them, in the stress pattern, or in a combination of these features. Thus the compound *blackbird* /blák-bə̂hrd/ differs from the phrase *black bird* /blâk-bə́hrd/ only in stress; the compound *altogether* /ɔ̀hltəgéðər/ differs from the phrase *all together* /ɔ̂hl-təgéðər/ in both stress and juncture; and the compound *gentleman* /džéntəlmən/ differs from the phrase *gentle man* /džêntəl-mán/ in stress, juncture, and modification of the second member from /man/ to /mən/. (Hyphens in the preceding examples indicate open juncture.) In French, the compound *pied-à-terre* /pjetatɛ:r/ 'temporary lodging' (literally 'foot-on-ground') differs from a phrase of similar structure in the modification of its first member, which has the form /pje/ as an independent word. In Latin and other languages, many words have a special COMBINING FORM which appears only in compounds (or only in compounds and derivatives). Thus Latin *corni-pēs* 'horn-footed, hoofed' consists of the two words *corn-u* 'horn' and *pēs* 'foot'; it is morphologically marked as a compound by the presence of the combining form *corni-*, which does not appear in any inflected form of the word itself. (The foreign-learned part of the English vocabulary also shows a number of special combining forms; cf. *electro-*, combining form of *electric*, in such compounds as *electromagnet*.)

Another feature in which compounds often differ from phrases is their indivisibility. The constituent words of a phrase may be separated by the insertion of other words; e.g. *a black bird* : *a black or bluish-black bird*, *a gentle man* : *a gentle old man*, contrast *a blackbird*, *a gentleman*. Contrast also the position of the compound *steamship* in the sentence *He sailed on a Cuban steamship*, with the split position of the phrase *old ship* in the corresponding sentence *He sailed on an old Cuban ship*—never *on a Cuban old ship*.

To describe the construction of a compound, we must identify not only the class (part of speech, etc.) to which it belongs, but also the class of each component member; and we must tell how these are put together by stating the order in which they are uttered, the features of juncture and accent which characterize them, and the phonemic modifications, if any, to which the component words are subjected in the process of compounding (cf. §4.4). A few

examples: *steamship*, a noun, composed of the two nouns *steam* and *ship* in open juncture, with loud stress on the first member and reduced loud on the second; *tryout*, a noun, composed of the verb *try* and the adverb *out* in close juncture, with loud stress on the first member and medial on the second; *gentleman*, a noun, composed of the adjective *gentle* and the noun *man* in close juncture, with loud stress on the first member and weak on the second, and with modification of /man/ to /mən/; *serio-comic*, an adjective, composed of the adjective *serious* in the combining form *serio-* and the adjective *comic* in open juncture, with reduced loud stress on the first member and loud on the second; *wild animal trainer* (spelled as if it were three words, but grammatically a compound), a noun, composed of the phrase *wild animal* and the derivative noun *trainer* in open juncture, with loud stress on the first member (i.e. on the first syllable of *animal*) and reduced loud on the second.

4.10. Immediate constituents. The last example in the preceding section illustrates an important principle of analysis, applicable to both compound and complex words, and also, as we shall see later (§5.4), to phrases. When a word contains three or more morphemes, it is usually necessary to analyze it into two and only two IMMEDIATE CONSTITUENTS, either or both of which may be susceptible of further analysis. Only in this way is it possible to reveal the morphological structure of the word; a mere listing of the morphemes, with no indication of their ORDERING, would tell us nothing about the constructions involved.

Thus the adjective *unmanly* does not consist simply of the three morphemes *un-*, *man*, and *-ly*; its immediate constituents are the complex word *manly* and the prefix *un-*. The adjective *gentlemanly* might seem at first glance to be a compound of *gentle* and *manly*; but closer inspection shows it to be complex, not compound, the immediate constituents being the compound word *gentleman* (analyzed in the preceding section) and the suffix *-ly*. The compound *wild animal trainer* contains five morphemes: *wild*, *anim-* (which appears also in *animate*), *-al*, *train*, and *-er*; but such a list fails to reveal the successive layers of construction which result in this word. The immediate constituents are, as we have already stated, the phrase *wild animal* and the complex word *trainer*; the analysis of the first member will occupy us in Chapter V; the second member is derived from the underlying verb *train* by the agent suffix *-er*.

As this example shows, one of the immediate constituents of a word may be a phrase; another illustration is the adjective *old-maidish*, derived by the suffix *-ish* from the underlying phrase *old maid*. A similar analysis applies to the so-called phrase-possessive. In the sentence *She is the king's daughter*, the inflected word *king's* consists of the base *king* and the suffix /-z/, an alternant of the regular possessive suffix /-ez, -z, -s/ [cf. §4.5 (2)]. In the sentence *She is the king of England's daughter*, the suffix /-z/ accompanies not merely the word *England* but the whole phrase *king of England*. The form *king of England's*, therefore, has a bound morpheme as one of its immediate constituents, and for this reason must be regarded as a complex word; cf. §5.3, end. (Contrast the sentence *He is the true king of England's people*, where the suffix /-z/ accompanies only the one word *England*.)

Occasionally an expression represents two different constructions according to the immediate constituents of which it is composed. Thus *old book dealer* may be a phrase consisting of the adjective *old* and the compound *book dealer* ('a book dealer who is old'), or it may be a compound consisting of the phrase *old book* and the derivative noun *dealer* ('a dealer in old books').

In the light of this principle, we can now clarify the definition of complex and compound words given in §4.2: A word containing one or more bound forms is called complex; a word made up wholly of smaller words is called compound. The following is a more accurate definition: If at least one of the immediate constituents of a word is a bound form, the word is complex; if both of the immediate constituents are free forms, the word is compound. (Thus *book dealer* is a compound, in spite of the presence of the bound form *-er*.)

4.11. Meaning and form. As appeared in §4.6, a language may have one or more than one category of inflection, according to whether the relation in meaning between constituent members of an inflectional paradigm is or is not the same for all paradigms in the language. In Japanese, most words are uninflected; among the inflected words, the members of a paradigm always differ from each other in exactly the same features of meaning. Thus the paradigm /ageru/ '(I) raise' : /agéyóo/ '(I) shall probably raise' or 'let's raise' : /agéréba/ 'if or when (I) raise' : /ageta/ '(I) have raised', etc. illustrates all the differences in meaning which can be expressed by inflection. Japanese, accordingly, has only one category of inflection, though the affixes and the internal changes are not the same for all bases. In Latin, on the other hand, the differences in meaning between *dux* 'a leader' : *ducis* 'of a leader' : *ducēs* 'leaders' : *ducum* 'of leaders', etc., do not parallel the differences between *amō* 'I love' : *amās* 'thou lovest' : *amat* 'he (she) loves', etc., or between *amō* 'I love' : *amābam* 'I was loving' : *amābō* 'I shall love', etc., or between *altus* 'tall' : *altior* 'taller' : *altissimus* 'tallest'. Latin, then, has several distinct categories of inflection; and a similar examination of English forms would show that here too the inflections are of different categories.

The element of meaning which differs from one member of a paradigm to another is called GRAMMATICAL MEANING; e.g. 'nominative singular' in Latin *dux*, 'genitive plural' in *ducum*, 'first person singular present indicative active' in *amō*. The meaning of the base itself, which normally remains constant in all the members of a paradigm, is called LEXICAL MEANING; e.g. 'leader' in *dux*, *ducis*, *ducēs*, etc., 'love' in *amō*, *amās*, etc.).

Although it is important to distinguish between grammatical and lexical meaning, and necessary in a systematic description of a language to define at least the grammatical meanings as carefully as possible, all our classifications must be based exclusively on FORM—on differences and similarities in the phonemic structure of bases and affixes, or on the occurrence of words in particular types of phrases and sentences. In making our classifications there must be no appeal to meaning, to abstract logic, or to philosophy.

The parts of speech, as we have seen (§4.6), must be defined either by their

inflection or else, in the absence of inflection, by their syntactic function; never by the real or fancied meanings which they express or by some preconceived scheme of 'universal grammar'. Thus the class of English verbs in defined as including words whose base may be accompanied by certain affixes or modified in certain other ways (including suppletion and zero change) to form the contrast between 'present' and 'preterit'. An exhaustive description of English verbs would mention other inflections also, as well as the various kinds of derivational paradigms in which they appear and their participation in compounds; but such inclusiveness is not necessary. Our definition is adequate if it merely specifies one or two inflections to which verbs alone are subject, and thus provides a clear formal criterion for the whole class. Since prepositions are not inflected in English (as the corresponding words are, for example, in Irish), they must be defined as a class by their syntactic function alone: that is, by the constructions in which they appear and by the kinds of words that accompany them.

The traditional definitions of the parts of speech, known to us from our school days, are based largely on philosophical considerations of meaning. 'A noun is a word used as the name of a living being or a lifeless thing.' Such a definition is useless: it tells us nothing about the structure of English, and does not enable us to recognize a noun when we meet one. 'The verb is that part of speech by means of which we make an assertion or ask a question.' Here a class that could be rigidly defined by its inflections is vaguely described, instead, by the meaning of some of its many syntactic functions—vaguely, since the description applies equally to nouns and pronouns.

The same stringent method which is required for the definition of word classes must guide us also in defining such inflectional categories as number, case, gender, tense, and mood. The words *man* and *wheat* are in English grammatically different from *men* and *oats* (singular versus plural) not because of their meaning—which we should certainly have trouble in defining exactly—but because the second pair of words is characterized by certain morphological processes (internal change, the suffix *-s*) which serve to differentiate the members of an inflectional paradigm, and because *man* and *wheat* are accompanied by *this* and *is* in the sentences *This man is tall, This wheat is tall,* whereas *men* and *oats* are accompanied by *these* and *are* in the sentences *These men are tall, These oats are tall.* In Latin, the nouns *dux* 'leader' and *amnis* 'river' are masculine, and the nouns *mulier* 'woman' and *mēnsa* 'table' are feminine—not because a leader is usually male and a woman always female, or because the Romans 'conceived of' a river as being somehow more virile than a table, but because they are accompanied by adjectives with different specialized suffixes: *dux bonus* 'a good leader' but *mulier bona, amnis lātus* 'a broad river' but *mēnsa lāta.*

The word classes (parts of speech) and the inflectional categories of a language, then, are determined exclusively by the morphological processes and the syntactic habits of the language itself. From this it follows that the number of such classes and categories, their subdivisions, and their functions will differ from language to language. All speech communities, we may be sure, have

ways of referring to 'a living being or a lifeless thing' and of 'making an assertion or asking a question'; but the grammatical distinction between nouns and verbs, vital in English and Latin, is completely wanting in many languages.

A single example is enough to illustrate this principle. English has a well-defined class of adjectives, differing both in their inflection and in their syntactic functions from all other parts of speech. But in Menomini (an Algonkian language now spoken in Wisconsin) we find that the word /kehkaatesew/ 'he is powerful' is exactly parallel in inflection to /pemaatesew/ 'he lives'; that is, in Menomini some of the verbs have meanings like those of our adjectives. We must not, in describing Menomini, say that its adjectives are inflected like verbs. It simply has no adjectives; and to use this term would be a distortion of the facts.

To the rule that only formal criteria can establish grammatical categories, we must add a final precept, already mentioned at the end of §4.6. Morphological and syntactic classifications must always be kept apart; no category based on one kind of analysis may include forms determined exclusively by the other kind. Thus, if we set up two CASES for English, a nominative and a possessive, on the basis of such partial paradigms as *boy* : *boy's*, *cat* : *cat's*, *men* : *men's*, then we may not apply the term possessive also to phrases like *of the boy*, *of a cat*, *of men*. The sentence *This is the boy's father* may mean exactly the same thing as *This is the father of the boy*; but if we were to admit lexical equivalence as a criterion for grammatical equivalence, we should be unable to draw the line between pairs like the one just cited and such widely dissimilar but still synonymous expressions as *What time is it?* and *Please tell me the time.* Again, if we have decided to call the difference between *play* and *played* or between *sing* and *sang* a difference in TENSE, we may not use the same term of the difference between *play* and *have played* or *will play* or *might play*. Such double use of technical terms, common though it is, will only confuse our account of the system and delay our understanding.

CHAPTER V. SYNTAX

5.1. Syntactic constructions. The analysis of constructions that involve only free forms is called SYNTAX. The first question to be answered is how we determine the LIMITS of a construction: Where does a syntactic form begin and end?

In studying a foreign language we learn, long before we begin to make a systematic analysis of its constructions, that the utterances which are complete in themselves are of various kinds. Some are minimal free forms, words (§4.2); others are sequences of two or more free forms. We can begin their classification by taking account of the suprasegmental phonemes of juncture and intonation (cf. §2.14, §3.7).

If we were analyzing the syntax of English, we should first list, from the texts which we had recorded in a phonemic notation, all the complete utterances ending in one of the four final intonations described in §3.7 (5). These we should call SENTENCES. Some sentences would be seen to contain only a single word (*Go! Yes.*), others more than one. Among the latter kind, there would be some with one or several non-final intonations medially; each segment of a sentence bounded by these intonations we could then define as a CLAUSE. Clauses again, we should find, may consist of a single word or of several; and the juncture between the constituent words may be open or close: *the man* /ðəmán/, *no indeed* /nôw-indíjd/.

Any syntactic construction of two or more words is a PHRASE; and the basis of all syntactic analysis must be an examination of phrases determined by phonemic criteria, chiefly by juncture and intonation. In most languages, sentences and clauses of more than one phrase show the same constructions as those of one phrase only.

When we have delimited our syntactic units in this way, we are ready to describe their make-up in terms of the word classes (parts of speech, §4.6) which appear in them. If the language has inflected words, these will offer a convenient point of departure. Thus, in English, we could speak of constructions involving nouns, adjectives, pronouns, verbs, or various combinations of these classes. Such a description makes it possible to determine, ultimately, the syntactic function of every word class.

In the rest of this chapter, we shall illustrate syntactic analysis by examining some sequences of free forms in English phrases and sentences; that is, we shall label and define some English constructions. Since English intonation has never been adequately described (cf. §3.7), we shall make but little reference to this important feature in our discussion; but a complete analysis of the language could not afford to neglect it.

5.2. The English actor-action construction. We begin with the following phrases: *John stumbled. John ran away. Our horses stumbled. Our horses ran away.* The first and the fourth (and, similarly, the second and the third) have no part in common, but the whole set shows the same arrangement; we can pass from any one of these phrases to any other by making one or two substitu-

tions. The English construction illustrated by these examples may be called the ACTOR-ACTION CONSTRUCTION; the phrases which are arranged in this construction are ACTOR-ACTION PHRASES. In learning to use a language we learn to recognize the FEATURES OF ARRANGEMENT which make up any given construction; in describing a language we must state these features.

To be sure, our school grammars do nothing of the sort, but merely try to define the constructions (and most other things) by vague references to their meaning; cf. §4.11. This does not much matter, since the pupils can speak English before they get the definitions; but when one is dealing with a strange language, such an approach would never reach the goal. By way of example, therefore, we shall speak briefly of a few features of English syntax, approaching them as though the language were entirely unknown to us.

5.3. Features of arrangement. The English actor-action phrase consists of two parts or CONSTITUENTS. Each constituent is a word or a phrase; in syntax the term EXPRESSION may be used to include both words and phrases. The way in which the constituent expressions are put together to form an actor-action phrase is described by reference to the FEATURES OF ARRANGEMENT which characterize the construction.

(1) In the first place, there is the SELECTION of the constituents. For instance, *never stumbled* and *John Brown* are not actor-action phrases. In particular, the constituents are not interchangeable: *John our horses* and *stumbled ran away* are not English phrases at all; and if, by changes of stress and pitch, we can make phrases of the same words (e.g. *John, our horses!*), these will not be actor-action phrases. Thus constituent A (*John; our horses*) and constituent B (*stumbled; ran away*) are taken from two different types of expression. We say that the English actor-action construction, like most syntactic constructions in most languages, has two POSITIONS which can be FILLED by various expressions. All the expressions which can fill a given position in a given construction thereby constitute a FORM-CLASS.

For convenience in discussion, we give names to form-classes. These names might be quite arbitrary, say A-expressions and B-expressions; but there is no serious objection to anticipating the knowledge that can be gained about the class-meanings of form-classes (§5.4) and giving them names based on these class-meanings. Accordingly, we call the expressions that fill the actor position in the English actor-action construction NOMINATIVE SUBSTANTIVE EXPRESSIONS, and those that fill the action position FINITE VERB EXPRESSIONS. Observe, however, that these are labels, not definitions; we do not define form-classes by vague references to their meaning, but by concrete statements about where they appear.

The privilege of filling a certain position is a FUNCTION of a form. A nominative substantive expression is any English expression which can be combined with a finite verb expression so that the resulting phrase is an actor-action phrase; conversely, a finite verb expression is any English expression which can be combined with a nominative substantive expression with the same result.

Finite verb expressions have no other function; but nominative substantive expressions have some other functions. They appear as predicate complements (*That's John*) and in mere naming, as on a sign (*John Smith, Pharmacist*). Each of these uses is a function of English nominative substantive expressions; all these functions together are called the function of nominative substantive expressions. Other aspects of this selection will occupy us later.

(2) A second feature of the English actor-action construction is ORDER. In our examples the actor expression precedes the action expression, and in colloquial English speech the order is never reversed in phrases of this kind.

This may be called the NORMAL type of our construction. There are several other types with different order, but in these also the order is fixed. For instance, in YES-OR-NO QUESTIONS the finite verb (which is, as we shall see, the central part of the finite verb expression) comes before the actor: *Did John run away?* Moreover, as this example shows, we find that only a few finite verbs are used in this type of actor-action construction: *is, has, does, can, dare, may, must, need, ought, shall, will.* Thus, in the form-class of finite verbs (which we have not yet defined) there will be a subclass of AUXILIARIES, which have, among other functions, the function of preceding the actor in a yes-or-no question. We observe, in passing, that two other special types of actor-action construction, the NEGATIVE (with the adverb *not*: *John didn't run away*) and the EMPHATIC (with contrastive intonation: *John did /ˈ/ run away*) show a comparable restriction: in these types also the finite verb is always an auxiliary.

Another special type of order in the English actor-action construction appears in the SPECIFIC INTERROGATION, which always begins with a form of a special form-class, an INTERROGATIVE EXPRESSION like *who, when, with whom* (except that this may be preceded by certain adverbs, conjunctions, and other words not essential to the construction). If the interrogative expression is the actor, the order is normal: *Who ran away? Whose horses ran away? Which horses ran away?* But if this is not the case, the interrogative expression precedes the actor, and the finite verb, again, is an auxiliary: *Why did John run away? For what reason did John run away?*

Another type of order is produced by the fact that certain adverbial expressions may precede the actor. (A) There is a type in which the unstressed *there* and the finite verb (in colloquial English usually *is, are, was, were*) both precede the actor: *There are some apples in the pantry.* (In formal English this type is more varied: *There came a day when . . . ; There has recently come to my notice . . . .*) There is further (B) a large subclass of adverbial expressions which may precede both the actor and the *there is* phrase: *Then John stumbled; Then there were some apples.* (C) Another subclass of adverbial expressions may precede the actor, but not the *there is* phrase: *Away ran John.* (D) Still another type of adverbial expressions does not upset the main feature of order, but is peculiar in preceding the finite verb: *John always stumbled.*

With slight differences of meaning, the same adverbial expressions (except for the *there is* type) appear in different places: *Yesterday our horses ran away* : *Our horses ran away yesterday; Then John stumbled* : *John then stumbled.*

(3) A third feature which often characterizes constructions is MODIFICATION: an expression is said to be modified when its phonemic form is different in a particular construction from the form which it has in isolation. In English this feature seems to be always accompanied by a fourth, MODULATION: the particular junctural and accentual structure of the form. In the phrase *John's run away, has* /haz/ is replaced by /z/ (modification) and lacks the loud stress which belongs to every independent word (modulation). Observe, in passing, that this feature of modification and modulation marks off a special subtype of our construction: when *has* is not combined with a participle (that is, when it is not an auxiliary), it is not weakened: *John has the basket.* There are parallel forms, often somewhat stilted in meaning, without the modification: *John has run away*; similarly *do not* /dúw-nôt/ beside *don't* /dównt/.

These four features of arrangement—selection, order, modification, and modulation—are the principal features of any construction, though their use differs in different languages, and some languages employ additional features, such as adjunct words and affixes, as members of a syntactic construction. Our possessive suffix /-ez, -z, -s/, as in *John's house*, approaches this character, but differs in being decidedly joined, in a special construction, to the preceding form. Thus, in answer to a question one may hear simply *John's*—never *'s house.* (Cf. §4.10.)

5.4. Syntactic meaning. Just as morphological classes (parts of speech) and categories cannot be adequately described except on the basis of form (§4.11), so the constructions, positions, and form-classes of syntax cannot be defined by talking about their meaning or by reference to some other language (such as Latin), but only by stating their recognizable features—that is, their form and function.

Nevertheless, we do want to know something about their meaning. In fact, it is only when we somehow distinguish the meanings of phrases with identical junctural and intonational features that we can recognize the different syntactic types and constructions. For instance, if we knew nothing about English, it would take us some time to see that *John ran* and *John stumbled* are phrases of a different type and construction from *John Brown* and *John Smith.* Similarly, we could not distinguish or describe such phrases as *fresh milk, hot milk, sour milk* on the one hand and *drink milk, fetch milk, heat milk* on the other, until we learned, say, that the former type merely name different kinds or states of milk, while the latter type order the hearer to do something with milk. However, it is not necessary to define meanings precisely or exhaustively; we need only know enough about them to distinguish the different types (cf. §1.2, §4.1). The meanings of the various constructions, positions, and form-classes are not separate things that can be taken under a microscope and described; they are merely the features of meaning common to all the actual expressions which occur in the construction, the position, or the form-class. Such features are necessarily vague, and differ subtly from language to language.

Let us look briefly at the meaning of the English actor-action construction. The most striking thing about it is its universality: it is the FAVORITE SENTENCE

TYPE of English. In any given utterance, an expression which is not in a construction with any other part of the utterance is a SENTENCE. Some utterances consist of only one sentence: *Fire!* or *John ran away*; others consist of more than one sentence: *There was a fire last night. Our horses ran away.* Very commonly, an expression which is one utterance figures as a sentence will appear, in other utterances, as part of longer sentences: *When John ran away, I followed him*; *We are late because our horses stumbled.* Now, in English, a sentence which consists of an actor-action phrase (or of several in coordination, see §5.5) has a feature of meaning which we can state roughly as 'complete utterance': it is one of the types of FULL SENTENCE. Contrast it with MINOR SENTENCES, which have not this meaning: exclamations, such as *Fire!*, and answers, hints, and namings, such as *Four o'clock, If I can, Mr. Smith—Mr. Jones.* There are only two other types of full sentence in English: COMMANDS, such as *Drink some milk* or *Don't run away*, and an archaic type of COLLOCATIONS, such as *The more the merrier.*

Another feature of the meaning of English actor-action phrases is the one for which we have named the construction: some object performs some action (or undergoes some action, or is in or gets into some state, and so on): *John ran away, got chased away, was scared, got scared, is tired*; *Pike's Peak is high.* Languages differ much in this respect; Latin, for instance, has both an actor-action construction (*pater amat* 'the father loves') and an undergoer-action construction (*pater amātur* 'the father is loved'). These two constructions may be called PREDICATIONS, which are either ACTIVE or PASSIVE. In meaning, the nearest English equivalents of Latin passives are actor-action expressions of certain special types (*John got chased away, was loved, was being beaten up*, and so on). Observe that the forms of each language have to be classified on their own merits, always on the basis of concrete formal (including functional) features. Thus we could pick out the English construction of the verb *be* accompanied by a past participle (*is built, was built, is being built, has been built*, etc.) and call it a passive construction; but we should have to remember that this English passive is a matter of syntax—not, like the Latin passive, a morphological category—and that the phrase *is built* or the like is only one of several types of phrases consisting of a verb plus a past participle (*has built, got built*). Formally, English *is* (*loved*), just as much as *is* (*lazy*), must be classed with *builds* (*a house*) or *has* (*built a house*).

Closely related to the meaning is the ORDERING of the constituents. If a foreign observer, is trying to analyze the phrase *Our horses ran away*, broke it up into the constituents *our* and *horses ran away*, he would make little progress toward an orderly description of English grammar. He would have to learn that the recurrent types of expression are *our horses* and *ran away*, and that this way of dividing the phrase is paralleled by such phrases as *Our horses stumbled, John ran away, John stumbled.* In short, we must always analyze a phrase into its IMMEDIATE CONSTITUENTS (see §4.10).

If one of the immediate constituents of a phrase should in turn be a phrase, this of course would have a construction of its own and would have to be analyzed similarly into its own immediate constituents, and so on, until finally the smallest constituent phrase had been broken up into words. At this point we should

have reached the end of our syntactic analysis; any further analysis (such as that of *stumbled* into *stumble* and *-d*) would belong to morphology. Thus, in syntax, the ULTIMATE CONSTITUENTS of any phrase are words.

5.5. The function of phrases. Turning from the structure of English actor-action phrases, we may now briefly consider their function. It is evident that any syntactic construction has two aspects: on the one hand, the phrases are made up in a certain way; and on the other, they can fill certain positions in larger phrases.

If a phrase has the same function as one or more of its immediate constituents, it is an ENDOCENTRIC PHRASE and has an ENDOCENTRIC CONSTRUCTION. Thus *fresh milk* has the same functions as *milk*: as we can say *Bring me some milk*, *Drink this milk*, *Boil it in milk*, so we can say also *Bring me some fresh milk*, *Drink this fresh milk*, *Boil it in fresh milk*, and so on. The constituent (here *milk*) which has the same function as the phrase (here *fresh milk*) is the HEAD, and the other constituent (here *fresh*) is the ATTRIBUTE. This type of endocentric construction, which has only one head, is an ATTRIBUTIVE or SUBORDINATIVE construction.

Other endocentric constructions have two or more heads but no attributes: *bread and butter*; *coffee, tea, or milk*. These are COORDINATIVE constructions; they consist of several heads and usually one or more COORDINATORS, such as *and*, *or*.

If a longer phrase has several layers of endocentric construction, there will be one or more heads at the very end of the structure. Thus *some very nice fresh milk* gives us first (by the principle of immediate constituents) the attribute *some* and the head *very nice fresh milk*; then we have the attribute *very nice* (whose structure need not concern us here, but is evidently attributive, with *nice* as the head) and the head *fresh milk*; and now we have the attribute *fresh* and the head of all heads *milk*. This ultimate head, which has the same function as the whole phrase, may be called the CENTER of the phrase. Similarly, in *wholesome bread and fresh butter*, the centers are *bread* and *butter*.

The phrase *this milk* is again endocentric and attributive because it has, on the whole, the same function as the constituent *milk*. In this case, however, there is a difference. We can put various adjective modifiers before the word *milk* (as well as before the phrase *fresh milk*), such as *nice* or *the* or *some*; but we cannot do this to the phrase *this milk* (or to the phrase *this fresh milk*). We say that the word *this* as an attribute CLOSES the construction: it restricts the function of the resultant phrase, since this phrase can enter into only one further construction of the same kind, namely with the attribute *all* (*all this milk*, *all this fresh milk*). The latter attribute completely closes the construction. However, in cases of closure we still speak of the construction as endocentric when the principal functions remain unchanged; thus *this milk* is still a substantive expression, like *milk*.

If a phrase has not the same function as any of its immediate constituents, it is an EXOCENTRIC PHRASE and has an EXOCENTRIC CONSTRUCTION. For instance,

the English construction of preposition plus object, such as *for John, of our horses, in fresh milk,* is exocentric: these phrases are not prepositions and not substantive expressions; they function rather as attributes of nouns (*a present for John*), of verbs (*wait for John*), and of adjectives (*good for John*). An exocentric construction has neither a head nor an attribute.

This brings us to our actor-action phrases. These are evidently exocentric; for unlike their immediate constituents, they serve as the favorite full sentence type, and they enter into construction with subordinating conjunctions (*when John ran away*) and with subordinate clauses (*Just as we reached the hill, our horses ran away*).

5.6. Syntactic form-classes. When we have analyzed all the typical constructions of a language and have reached the ultimate constituents of many typical phrases, we get many form-classes of words. Thus the centers of our substantive expressions turn out to be SUBSTANTIVES of various types (*John, horses, she*); the centers of our finite verb expressions are FINITE VERBS (*ran, stumbled, is*); from our coordinative expressions we get COORDINATORS (*and, or*); from our exocentric phrases we get PREPOSITIONS (*for, of, in*) and SUBORDINATING CONJUNCTIONS (*when, if, as*).

These largest form-classes of words are called PARTS OF SPEECH; cf. §4.6. The number and definition of the parts of speech that we set up for a language will depend on the constructions we choose. If we start with the actor-action construction in English, we get finite verbs as a large and important form-class of words. In the traditional scheme of English grammar, one considers also the other constructions and especially the inflectional paradigms, and in that way one gets VERBS as a part of speech. This includes not only finite verbs (*ran, is, are, was*) but also infinitives and participles (*running, be, been*), which do not serve as centers in the action position. We shall see that substantives, which serve as centers in the actor position, can be divided into smaller form-classes (nouns, pronouns).

5.7. Analysis of a form-class. We shall finish our sampling of English syntax by examining briefly the expressions which serve as actors in the actor-action construction—that is, the nominative substantive expressions.

(1) CONGRUENCE. We find that there is a feature of selection by which certain types of finite verbs are assigned to certain actors: *I am; he* (*John, the house*) *is; we* (*you, they, John and Bill, the houses*) *are.* Here one of the constituents, the finite verb, varies according to the class of another constituent, the actor expression. This kind of selection is called CONGRUENCE.

The classes thus set up among nominative substantive expressions are, first, the word *I*, which alone is used with *am*; second, the words *he, she, it,* some other pronouns, and all nouns which are singulars in their inflectional form; and third, the words *we, you, they,* some other pronouns, and all nouns which are plurals in their inflectional form, as well as coordinative phrases of singular nouns with the coordinator *and.* Notice that this classification enables us to

distinguish singular and plural in nouns whose base is subject only to zero modification (§4.5): *The sheep is running* : *The sheep are running.*

(2) SUBCLASSES. Nominative substantive expressions are often subordinative phrases, with a head and one or more attributes (*our horses, poor old John, rats in the cellar, milk which is no longer fresh*). Examining one type of these, the type in which the attributes precede the head (*our horses, poor old John*), we find that some words are never preceded by modifiers: *I, we, you, he, she, it, they, who, what, somebody, something,* etc. These belong to a subclass of substantives called PRONOUNS. (Pronouns can be defined also by some other peculiarities of construction, and some of them have irregular inflection as well.)

Apart from pronouns and from INFINITIVE EXPRESSIONS preceded by *to* (*To scold them would be useless*), the centers of our nominative substantive expressions make up the form-class of NOUNS. Some singular nouns are always preceded by at least one attribute: *house, apple, boy*; and the attribute or one of the attributes will always be one of the following:

(A) *the, this, that; any, no, some, what, which, whatever, whichever*; or a possessive expression (*John's, my, our*);

(B) *a* or *an, each, either, every, neither, one.*

These attributes precede most others in the same construction (*the big house, any fresh milk, John's old mother, a good boy*).

Thus we obtain a class of ADJECTIVES, which precede nouns as attributes, and among them a subclass of DETERMINERS, the expressions in (A) and (B) above. By observing the behavior of adjectives with nouns, we are able to set up among the latter a subclass of BOUNDED NOUNS, which in the singular always have a determiner before them. Another subclass of nouns is defined by the fact that in the singular they occur either without a determiner or with a determiner of class A: *milk, fresh milk, the milk* (but never *a milk*); these are MASS NOUNS. Other nouns take determiners of both class A and class B, but occur also in the singular without determiners: *kindness, this kindness, a kindness*; these are ABSTRACT NOUNS. And still other nouns normally take no determiners at all: *John, Chicago, December*; these are PROPER NOUNS. (Note how the four subclasses of bounded nouns, mass nouns, abstract nouns, and proper nouns have here been defined without any reference to their meanings.)

(3) GOVERNMENT. As objects of verbs in the VERB-OBJECT construction (*hit John, drink this milk*) and as objects of prepositions (*for John, in milk*), some of the pronouns have a special inflectional form: *They saw me, us, him, her, them; Whom did they see?* This criterion defines the form-class of ACCUSATIVE SUBSTANTIVE EXPRESSIONS. Nominative and accusative substantive expressions together make up the class of SUBSTANTIVE EXPRESSIONS. Observe that the difference between the two is again a matter of selection: the choice is made according to the position in which the forms appear (nominative for the actor position in the actor-action construction and in some others, accusative for the object position in the verb-object construction). Selection of this kind is called GOVERNMENT: certain constituents in a construction are said to govern the form

of the other constituents. (In English, only some of the pronouns and none of the nouns distinguish formally between nominative and accusative expressions.)

In another position, that of PREDICATE COMPLEMENT, many speakers of Standard English use either form of the pronoun *I*, saying *It's I* or *It's me* with equal naturalness; in the plural, the form *It's us* would be normal to most of these speakers instead of *It's we*. In the case of other pronouns, many of these same speakers would use the nominative form in the position of the predicate complement, saying *It's he* (*she, they*), or at least avoiding the form *It's him* (*her, them*).

Speakers of other English dialects, including not a few speakers of Standard American English, use as predicate complement the accusative forms of all pronouns except *who*.

These last illustrations are an example of a complicated linguistic situation that often worries people with conventional grammatical training. Because such training involves 'logical' considerations, people want to know what is 'correct', and want to have 'logical' or 'rational' explanations to back up the prescriptions of correctness. It cannot be too strongly emphasized that every language contains complexities and irregularities, and that logical arguments—whether to support or to condemn a given usage—have no pertinence whatever in the study of linguistic phenomena. For both practical purposes and scientific analysis, A LANGUAGE IS THE WAY PEOPLE TALK, NOT THE WAY SOMEONE THINKS THEY OUGHT TO TALK.

When the observer has determined the phonemic structure of a language, and has classified all its constructions, both morphological and syntactic, the resulting description will be an accurate and usable grammar of the language, accounting in the simplest possible way for all the utterances of the speech community, and presenting the clearest possible summary for the use of students and scientific linguists alike.

READING LIST

The following list of books and articles is not intended as a bibliography of linguistics. It is a selection of material that will be of genuine and immediate use to anyone who wishes to learn more about the matters treated in this booklet and is willing to read with concentration. Descriptive comments are added in square brackets to guide the reader in his choice.

CHAPTER I. LANGUAGE AND LINGUISTICS

LEONARD BLOOMFIELD, *Language*, Chapters 1–4, 9, 28 (New York, 1933). [The best introduction to linguistics; clear, thorough, and sound, but not easy.]

LEONARD BLOOMFIELD, *Linguistic Aspects of Science* (International Encyclopedia of Unified Science 1.4); Chicago, 1939. [Explanation of science as a special form of linguistic behavior; sane approach to scientific problems.]

LEONARD BLOOMFIELD, 'Philosophical Aspects of Language', *Studies in the History of Culture* 178–84 (Menasha, Wis., 1942). [Elementary exposition of the part that language plays in human society.]

FRANZ BOAS, *Handbook of American Indian Languages*, Part I (Smithsonian Institution, Bureau of American Ethnology, Bull. 40); Washington, 1911. [Introduction to linguistic method, with reference to the analysis of unwritten languages.]

EDWARD SAPIR, *Language*, Chapters 1, 10, 11 (New York, 1921 and 1939). [Brilliant non-technical discussion for the educated layman, based on a knowledge of many different languages.]

EDWARD SAPIR, 'The Status of Linguistics as a Science', *Language* 5.207–14 (1929). [On the relation of linguistics to other sciences, and on its importance for an understanding of human behavior in general.]

ALBERT P. WEISS, 'Linguistics and Psychology', *Language* 1.52–7 (1925). [A realistic psychology of language; expanded in the same author's book, *A Theoretical Basis of Human Behavior*, 1929.]

BENJAMIN LEE WHORF, 'Science and Linguistics', *The Technology Review* (Massachusetts Institute of Technology), Vol. 42 (1940); 'Linguistics as an Exact Science', *ibid.*, Vol. 43 (1940); 'Language and Logic', *ibid.*, Vol. 43 (1941). [Bold and provocative popularization of some of the methods and results of linguistic science.]

CHAPTER II. PHONETICS

OTTO JESPERSEN, *Lehrbuch der Phonetik*, 2d ed.; Leipzig and Berlin, 1913 and later. [The best scientific approach to general phonetics; clear and systematic; fair diagrams.]

DANIEL JONES, *An Outline of English Phonetics*, 6th ed.; New York, 1940. [Description of British English, but with a wealth of material important for general phonetics and with many excellent diagrams.]

H. KLINGHARDT, *Artikulations- und Hörübungen*, 2d ed.; Cöthen, 1914. [The best introductory manual for the beginner; detailed and lucid information about the vocal organs, with helpful exercises.]

HANS KURATH and others, *Handbook of the Linguistic Geography of New England*, Chapter 4 (Providence, 1939). [States the case for impressionistic recording in dialect work, and describes the phonetic alphabet of the Linguistic Atlas of New England.]

G. NOËL-ARMFIELD, *General Phonetics*, 4th ed.; Cambridge, 1931. [A poor work, but the only one in English attempting to cover the whole field.]

HENRY SWEET, *The Sounds of English*, 2d ed.; Oxford, 1910. [A masterpiece of clarity and sense; a small book but a fine one. *A Primer of Phonetics* by the same author (3d ed. 1906) is also recommended.]

D. WESTERMANN and IDA C. WARD, *Practical Phonetics for Students of African Languages;* London, 1933. [Exceptionally useful survey of the general field, with good descriptions of exotic sounds, and valuable diagrams.]

CHAPTER III. PHONEMICS

LEONARD BLOOMFIELD, *Language*, Chapters 5–8 (New York, 1933). [Again the best introduction to the subject; different in some details of approach, definition, and terminology from the present booklet.]

EDWARD SAPIR, 'Sound Patterns in Language', *Language* 1.37–51 (1925). [Classic statement of the phonemic principle in non-technical terms; basic to an understanding of the reason for phonemic study.]

MORRIS SWADESH, 'The Phonemic Principle', *Language* 10.117–29 (1934). [General exposition; recommended for its clarity, though different in several respects from the treatment in this booklet.]

MORRIS SWADESH, 'The Phonemic Interpretation of Long Consonants', *Language* 13.1–10 (1937). [A special problem treated so as to reveal the underlying principles involved in phonemic classification.]

GEORGE L. TRAGER and BERNARD BLOCH, 'The Syllabic Phonemes of English', *Language* 17.223–46 (1941). [Arguments for the phonemic analysis of English presented in §3.7 of this booklet; footnotes 1 and 4 of the article contain further bibliography.]

W. F. TWADDELL, 'Phonemics', *Monatshefte für deutschen Unterricht* (Madison, Wis.) 34.262–8 (1942). [Simplified exposition, valuable for its insistence on rigorous methods.]

CHAPTER IV. MORPHOLOGY CHAPTER V. SYNTAX

LEONARD BLOOMFIELD, *Language*, Chapters 10–16 (New York, 1933). [Thorough introduction to the techniques of grammatical analysis; difficult reading, but far more rewarding than any other treatment.]

CHARLES CARPENTER FRIES, *American English Grammar;* New York and London, 1940. [A model treatment, presenting the grammar of a familiar language as an objective classification of the facts of speech, without concessions to the traditional view; a fascinating work.]

ZELLIG S. HARRIS, 'Morpheme Alternants in Linguistic Analysis', *Language* 18.169–80 (1942). [A technique for treating the r ıology of a lanıuage as systematically and as simply as its phonemics; sı.ggestive but not easy.]

OTTO JESPERSEN, *Analytic Syntax;* Copenhagen, 1937. [Schematic treatmen of syntax, with all constructions reduced to simplified formulae; illuminatin but rather superficial, and hardly applicable to languages of radically different structure from English.]

OTTO JESPERSEN, *The Philosophy of Grammar;* London and New York, 1924 and later. [Survey of grammatical categories in many languages by an invariably stimulating writer.]

EDWARD SAPIR, *Language,* Chapters 4–6 (New York, 1921 and 1939). [Clea exposition of grammatical processes and categories, interpreted by one of the greatest of all linguists.]